

MINERALOGICAL ABSTRACTS

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Notices of Books.

NIGGLI (P.). *Krystallographische und strukturtheoretische Grundbegriffe*. Handbuch der Experimentalphysik, herausg. v. W. Wien u. F. Harms, vol. 7, pt. 1, Leipzig (Akademische Verlagsgesellschaft), 1928, xii + 317 pp., 131 figs. Price 30.50 Mk. (bound 32.50 Mk.).

This 'Handbook' of physics, commenced in 1926, is a collection of exhaustive monographs on special subjects, and when completed it will form quite a library of handsome volumes. Vol. 23, for instance, deals with phosphorescence and fluorescence, and Part I of this volume costs 71 marks. Vol. 25 is to treat of various branches of geophysics. The series is evidently intended as a reference and working library for experimental physicists. The present crystallography volume scarcely seems to fulfil this purpose. It deals theoretically with the structure theory and has little or no direct experimental bearing. Rather than being suitable for ready reference, it will require close and prolonged study to arrive at the author's point of view. Some of the matter is commonplace, e. g. tables of formulae giving all the possible variations for solving right-angled spherical triangles; but much of it is quite abstruse. The new departures in nomenclature and the array of special symbols are quite 'phenomenological'. The spelling 'Krystall', 'Krystallographie', &c., through the volume is a sign of some editorial control; but it is strange to see in the literature lists at the end of each chapter Groth's *Zeitschrift* quoted as 'ZS. f. Krist.' and the spelling 'cristallography' in several English titles. The book is very clearly printed on good paper and is well bound.

L. J. S.

HIBSCH (J. E.) & others. *Mineralogisches Taschenbuch der Wiener Mineralogischen Gesellschaft*. 2. Auflage, Wien (J. Springer), 1928, x + 187 pp., 1 pl. Price 10.80 Mk.

The first edition of this useful little pocket-book, issued by the Vienna Mineralogical Society, appeared in 1911 [Min. Mag., vol. 16, p. 75]. The main part, by R. Koechlin, is occupied by an alphabetical list of some 6,300 mineral and gem names, giving synonymy or very brief descriptions [we find here several names not known elsewhere, but without

authority or references to the literature they are useless], followed by a tabulation of the essential characters of about 1,150 well-defined species. A chapter on the determination of gem-stones is added by H. Michel, and one on the mines of Austria by O. Rotky. Particulars are also given about the Vienna Mineralogical Society, and of the public and private collections of minerals in Vienna. The frontispiece gives a portrait of F. Becke.

L. J. S.

GOLDSCHMIDT (Victor) & GORDON (Samuel G.). *Crystallographic tables for the determination of minerals*. Acad. Nat. Sci. Philadelphia, 1928, Special Publ. no. 2, 70 pp., 4 figs. Price \$1.50.

This useful pamphlet tabulates in numerical order the crystallographic constants (angles and axial ratios or their equivalents) that have been determined for all minerals. It thus serves the same determinative purpose as the tables of Fedorov [M.A. 2-100] and Boldyrev [M.A. 3-159]. 1,217 species are listed, and the chemical composition, specific gravity, hardness, cleavage, &c., are stated for each. The several tables are based on the Goldschmidt two-dimensional gnomonic method and symbols, and a brief explanation of these is given in the introduction. General experience shows that books of reference that are based on special methods and symbols, which it is necessary to study and puzzle out beforehand, are little used. The present tables would have found a more ready use if the equivalent Miller symbols of three-dimensional geometry had also been added at the head of the columns in the tables.

L. J. S.

BRALY (A.) [1864-1927]. *Détermination et étude des minerais*. Paris (E. Veneziani & Cie), 1927, 295 pp., 2 pls., 64 text-figs. Price [21s.].

This book was published just before the death of the author,¹ and it would appear that he had not been able to put on all the finishing touches. A preface or introduction and an index or table of contents are wanting, and there are issued as loose sheets a long (but incomplete) list of errata and a list of the many abbreviations used in the text. The author was a prospector, and since 1920 he had written several papers [M.A. 1-295, 2-144, 2-354, 3-53, 3-108] on improved methods for the blowpipe analysis of ore-minerals. These are now collected together and extended to form a book. Part IV (pp. 153-251) gives the characteristic

¹ Obituary notice by A. Lacroix in Bull. Soc. Franç. Min., 1927, vol. 50, pp. 460-463.

blowpipe reactions, together with other tests by the wet way, for each of the chemical elements arranged alphabetically.

L. J. S.

MICHEL (Hermann). *Nachahmungen und Verfälschungen der Edelsteine und Perlen und ihre Erkennung*. Wissenschaftliche Veröffentlichungen des Kriminalistischen Laboratoriums der Polizeidirektion Wien, Graz (Ulr. Moser), 1926, vii + 135 pp., 73 figs. Price [13s. 6d.].

It is necessary to distinguish between (1) artificial gems, i. e. gemstones possessing all the characters of natural stones but produced by artificial means, and (2) imitation and counterfeit gems. The present volume treats of (1) less fully than in the same author's 'Die künstlichen Edelsteine' [M.A. 3-157], while (2) is dealt with in rather more detail. Besides glass ('paste') imitations and doublets, mention is made of the alterations in colour of genuine stones by heat, radiations of various kinds especially from radium, and by chemical means; and the substitution of different stones by the confusion occasioned by deceptive trade-names. A chapter explains the use of the microscope in the examination of stones, and of an apparatus for comparative colour tests. A large part (pp. 56-113) of the book deals with imitation and 'culture' pearls.

L. J. S.

SCRIVENOR (J. B.). *The geology of Malayan ore-deposits*. London (Macmillan & Co.), 1928, xv + 216 pp., 4 pls., 47 text-figs. Price 16s.

This sketch is largely based on the author's own observations made since 1903 as Geologist to the Federated Malay States Government. Gold was formerly of greater importance, and now tin-ore easily takes the first place. Tungsten and iron ores are also available in considerable quantities. A chapter is devoted to the mineralogy of cassiterite. In the concentrates of tin-ore 34 mineral species have been detected. A map shows the positions of a hundred mines in the Kinta tinfield, and a useful mineral map (scale 20 miles to 1 inch) of Malaya indicates the occurrences of gold, tin, and tungsten in relation to the granite outcrops. There is a detailed bibliography of 149 items and a good index in which localities are fully listed.

L. J. S.

BEHREND (Fritz) & BERG (Georg). *Chemische Geologie*. Stuttgart (F. Enke), 1927, x + 595 pp., 61 figs. Price [40s.].

The matters dealt with in this book include: I, Geochemistry of the crust and of the interior of the earth, and the distribution of the chemical elements. II, Chemistry of magmas. III, Magmatic exhalations. IV, Rock weathering. V, Formation of sediments. VI, Chemistry of metamorphism.

L. J. S.

Instruments and Apparatus.

LEISS (Carl). *Die modernen optischen Messinstrumente des Kristallographen und Petrographen, ihre Beschreibung und Justierung.* Fortschr. Min. Krist. Petr., 1925, vol. 10, pp. 5-88, 28 figs.

Detailed descriptions and adjustments of various pieces of apparatus made by C. Leiss at Steglitz near Berlin, including goniometers (one- and two-circle), optic axial angle apparatus, refractometers, microscopes (including theodolite-microscopes), and monochromators. [Cf. M.A. 2-486-7.] L. J. S.

KOENIGSBERGER (J.). *Experimentelle Hilfsmittel der hydrothermalen Synthese bei hohen Temperaturen und Drucken.* Fortschr. Min. Krist. Petr., 1927, vol. 11, pp. 41-48, 6 figs.

Supplementing the report by W. Eitel [M.A. 3-174], descriptions are given of the apparatus used for the hydrothermal synthesis of minerals at temperatures of 400-500° and pressures up to 400 atmospheres in the presence of water. The earliest form is that of C. Schafhäütl (1845), and the latest that of W. J. Müller and J. Koenigsberger [M.A. 1-234]. L. J. S.

PALACHE (Charles) & LEWIS (Lyman W.). *A saw attachment adapting Goldschmidt's model cutting machine to the sawing of wooden models.* Amer. Min., 1927, vol. 12, pp. 154-156, 2 pls.

With Goldschmidt's machine, crystal models are made by planing down plaster. In the present modification a circular saw worked by a small motor enables each face to be made by a single cut in wood. A modified holder and centring vice are provided. L. J. S.

FRASER (F. J.). *A simple apparatus for heavy mineral separation.* Econ. Geol., 1928, vol. 23, pp. 99-100, 1 fig.

A small tapering U-tube corked at the wider end is two-thirds filled with bromoform. The concentrate to be separated is introduced into the wider limb, and with a little manipulation grains of the heavy minerals can be delivered from the narrow end on to a microscope slide for examination. L. J. S.

LINGEN (J. Steph. van der). *A simple frictionless apparatus for determining the specific gravity of hand specimens.* Trans. Geol. Soc. South Africa, 1927, vol. 29 (for 1926), pp. 91-94, 3 figs.

A simple apparatus, constructed of a pine board, two nails, and a piece of string, can be used to determine the specific gravity of large rock and

mineral specimens, and yields results which are accurate within the limits required for geological purposes. S. J. S.

GORDON (Samuel G.). *The convenience of a rotating table in the use of a two-circle goniometer.* Amer. Min., 1928, vol. 13, pp. 117-118, 1 fig.

With the Goldschmidt two-circle goniometer the two verniers cannot be read from one position of the observer. This is obviated by mounting the instrument together with the lamp on a rotating table, such as those used by a group of microscopists. L. J. S.

BROWNMILLER (L. T.). *The preparation of optically clear selenium for use in index media.* Amer. Min., 1927, vol. 12, pp. 43-48.

Commercial selenium, used in selenium-sulphur mixtures as immersion media for the determination of refractive indices (2.05-2.75), is often cloudy owing to admixed selenium dioxide. The material can be purified by distillation in an atmosphere of carbon dioxide. L. J. S.

RÖSCH (Siegfried). *Ein graphischer Projektions-Transporteur.* Zeits. Krist., 1926, vol. 64, pp. 76-78, 1 plate.

Suppose that O is the centre of a projection of a sphere on to a plane, and that P is the projection of any other point of the sphere. In crystallography we often require the distance OP , knowing the angular distance of the points on the sphere of which O and P are projections. The plate here given is a protractor which enables us to obtain this distance whether the projection is gnomonic, stereographic, linear, reflection, orthographic, angular, or Lambert's projection. H. H.

CHUDOBA (Karl). *Die Verwendung des Reflexgoniometers für Messungen von Zentraldistanzen und Flächenbreiten.* Centr. Min., Abt. A, 1927, pp. 321-324, 2 figs.

In studying the habit of crystals, and the rate of growth perpendicular to particular faces, the central distance ('ZD') [M.A. 3-224] and the width of faces can be measured on the one-circle goniometer. The crystal is set so that its thickness between a pair of parallel faces can be measured on a micrometer scale in the eyepiece of the telescope, this giving twice the central distance. L. J. S.

RÖSCH (S.). *Die Intensitätsverhältnisse bei Reflektogrammen.* Zeits. Krist., 1927, vol. 65, pp. 28-45, 19 figs.

In an earlier paper [M.A. 3-172] the author gave a method in which the angles between the faces of a crystal are measured by photographing the reflections of a given light-signal from all these faces simultaneously.

He here determines the intensity of these reflections for various angles of incidence, positions of the photographic plate, &c., and illustrates the theory by photographs of the light-figures for etched and natural crystals.

H. H.

HERLINGER (Erich). *Über ein neues Photogoniometer*. Zeits. Krist., 1927, vol. 66, pp. 282-296, 13 figs.

In this goniometer a cylinder bearing the photographic film has its axis vertical and geared to another vertical axis bearing the crystal at its summit, so that the two axes rotate together. As each crystal face comes into a given position, it reflects a ray of light from the source through a stop on to the film. The dark spots obtained on the film after development give the angles between the faces.

H. H.

RÖSCH (Siegfried W.). *Über Reflexphotographie*. Abhandl. Math.-phys. Kl. Sächs. Akad. Wiss., 1926, vol. 39, no. 6, 62 pp., 7 pls., 90 text-figs.

A more detailed account of the method [M.A. 3-172] of photographing the reflections from crystal faces and the etched surfaces of crystals, and its further application to faceted gem-stones, metal cylinders, liquid drops, &c. Zonal curves are given for projections on plane and cylindrical surfaces.

L. J. S.

BERNAL (J. D.). *A universal X-ray photogoniometer*. Journ. Sci. Instr. London, 1927, vol. 4, pp. 273-284, 4 figs.

All the photographic X-ray methods are combined in the universal instrument described by the author. He gives an account of the range of accuracy and utility of all X-ray methods and then proceeds to a more detailed survey of rotation photographs and the use of the photogoniometer for this purpose. A résumé of the reciprocal lattice and its particular application to rotation methods by the author [M.A. 3-333] is followed by an account of operations necessary for determination of the cell sizes and indices. Three complete rotation photographs are taken for each of the three principal axes of the crystal in turn. In general, analysis of these photographs gives the cell size and shape and also the indices; but oscillations through small angles produce restricted photographs in which not only overlapping spots of the complete rotation photographs are separated out, but also spots hitherto hidden in the fogged background or too faint are rendered visible. The oscillation method is thus an invaluable aid to the complete rotation method in determining the indices of the reflecting planes.

F. A. B.

KSANDA (Charles J.). *An electromagnetic separator for laboratory use.* Journ. Opt. Soc. Amer. & Rev. Sci. Instr., 1926, vol. 13, pp. 713-715, 2 figs.

Details of construction are given for an instrument claimed to be accurately comparative and capable of effecting fractionation more speedily and accurately than the older types of separator. The instrument weighs 46 lb., operates at 110 volts direct current maximum, and carries 1.95 ampères.

F. A. B.

Optical Determination of Felspars.

SIGG (Henri) & FAVRE (Georges). *Quelques courbes nouvelles pour la détermination des feldspaths par la méthode de Fedoroff.* Bull. Soc. Vaud. Sci. Nat., 1917, vol 51, pp. 341-380, 2 pls., 18 text-figs.

A revision of existing data on the twins of plagioclase leads the authors to the conclusion that the pericline law is not the only one in which the plane of association varies with the composition of the felspar, in fact they regard every vicinal face of no matter what zone as a possible plane of association containing two twin-axes. In a stereographic projection, with n_α , n_β , n_γ as axes, are plotted the poles of vicinal faces in the principle zones of plagioclase, the angles being plotted for eleven felspars varying by 10 % An. from albite to anorthite. A second plate gives a revised curve of migration of the pericline plane of association and several curves for complexes plotted from the available data. This paper has been adversely criticized by R. Sabot (see following abstracts).

W. C. S.

SABOT (R.). *La méthode de Fedoroff et son application à la détermination des feldspaths.* Compt. Rend. Soc. Phys. Hist. Nat. Genève, 1918, vol. 35, pp. 72-76.

Brief summary of a prize essay, 'A study of the felspars', referring to the influence of a triclinic KAISi_3O_8 on the optical constants of the plagioclases. The variation of the twin-plane has been studied in pericline twins, and a similar variation established in Carlsbad twins and in Esterel-Ala twins. Fine twin-lamellae parallel to m (110) and t (110) were observed. In normal hemitropes no variation is found in the position of the twin-plane. The explanation of these variations as due to the presence of vicinal faces, put forward by H. Sigg and G. Favre, is not accepted.

W. C. S.

SABOT (R.). *La technique de Fédoroff*.—*Simplifications au cours du travail et des reports*. Compt. Rend. Soc. Phys. Hist. Nat. Genève, 1920, vol. 37, pp. 51-53.

Procedure to be adopted to avoid confusion in plotting readings taken on the Fedorov stage. In the projection, poles are plotted instead of planes, as the drawing then becomes less confused. These suggestions are embodied in a later paper. [M.A., 2-347.] W. C. S.

SABOT (R.). *Les macles des feldspaths*. Compt. Rend. Soc. Phys. Hist. Nat. Genève, 1920, vol. 37, pp. 53-58.

A classification of the possible twins of feldspar based on the ideas of C. Viola, developed and generalized as a result of research by the Fedorov method. The main points of this note are embodied in a later paper. [M.A., 2-347.] W. C. S.

SIGG (Henri) & CARRASCO (Elvira). *Macles de Manebach, Ala et complexe: étude des angles d'extinction sur les sections orientées*. Bull. Soc. Vaud. Sci. Nat., 1919, vol. 52, pp. 219-232, 3 figs.

Data are given in four tables for the extinction in oriented sections of seven plagioclases of known composition and of the corresponding individuals in Manebach, Ala, and Ala-Manebach 'complex' twins. A graphical and an analytical method for obtaining the extinction-angles from the existing data for these feldspars is explained. W. C. S.

CARRASCO (Elvira). *Contribution à l'étude des macles des feldspaths au moyen de la méthode de Fédoroff*. Bull. Soc. Vaud. Sci. Nat., 1920, vol. 52, pp. 483-564.

A general account of the twins of feldspar and the Fedorov method, with tabulated measurements made on 37 feldspars in rocks from various localities. The results show variations from the curves of migration of twin-axes as drawn by Fedorov, and it is considered that variations, if not amounting to 3° or 5° at least, should not be regarded as evidence of departure from the simple twin-laws. The proof of twinning on vicinal faces, suggested in an earlier paper, requires curves plotted with much more exact data than is at present available. Departures are also found from Michel Lévy's curve connecting the optic axial angle with the composition of the plagioclase. W. C. S.

GYSIN (Marcel). *Sur certaines roches de la Pavdinskaya-datcha (Oural)*. Thèse Fac. Sci. Univ. Genève, 1920, no. 650, pp. 107, 13 text-figs.

The rocks described are gabbros, peridotites, &c., of the 'gabbro zone' of the Pavdinsk estate, Urals, part of the region of which an account has

been given by L. Duparc and A. Grosset (M.A. 1-327). In the course of the work a complete study of the feldspars and of the pyroxenes and hornblendes has been made by the methods of Fedorov. Uralitization is found to be important in the gabbros, gabbro-diorites, and pyroxenites, and results not from local secondary alteration but from a very widespread magmatic change. By using the Fedorov stage it is shown that the pyroxene and the replacing hornblende have (010), the edge [001], and the optic axial plane common to both. The results of a very large number of feldspar determinations are summarized in the last chapter. The variation of basicity in each kind of rock is shown in a table. The greatest variation is shown in gabbro-diorites, 46 to 93 % An, but this in strongly zoned crystals, and a critical examination of the author's measurements shows that a variation of 10 % An above or below the average composition of the feldspars covers nearly all cases. For the hypersthene-gabbros (gabbro-norite) the variation found in ten crystals is only 52 to 63 % An, the average being 58 % An. Other tables show the distribution of types of twins and the relation between the basicity of the feldspar and the types of twins. Pericline twins are most abundant in the troctolites, and become less so as the basicity of the rock decreases. The composition of the feldspars twinned on the pericline law only seems to remain almost invariable (about 89 % An) and independent of the composition of the rock; albite twins, on the other hand, vary in composition in the same sense as the basicity of the rock. W. C. S.

GYSIN (M.). *Note sur l'étude de quelques caractères des plagioclases.* Compt. Rend. Soc. Phys. Hist. Nat. Genève, 1922, vol. 39, pp. 70-73.

The author summarizes the results of his thesis (preceding abstract), and continuing the research he has studied the feldspars of some other rocks and found the variations in composition of phenocrysts and microlites of plagioclase in six different rocks to be as follows: in granite from Sysstert, Urals, variation 22-30, average $27\frac{1}{2}$ % An; crystals somewhat zoned in diabase, from Callao, Venezuela, variation 58-67, average 63 % An; in diabase-porphyrite from Pavdinsk estate, Urals, variation in phenocrysts 54-64, average 60 % An, in microlites 41-62, average 54 % An; in a basalt from Madagascar, phenocrysts 65-80, average 73 % An, microlites 66-78, average 68 % An; in a second basalt from Madagascar, phenocrysts 54-68, average 62 % An, microlites 57-76, average 68 % An; in a hypersthene-andesite from Cap Marsa, Algeria, variation in strongly zoned phenocrysts 40-90, average 58 % An, micro-

lites 47-72, average 58 % An. The frequency of different twin-laws or combinations of twins in the different rocks is recorded. The most striking instances of the preponderance of one combination are found in the diabase-porphyrity of Pavdinsk, in which, out of 36 crystals measured, 30 are albite-Carlsbad twins; and in the diabase of Callao, where, out of 61 crystals measured, 50 are albite-Carlsbad twins. W. C. S.

REINHARD (Max). *A propos de la détermination des plagioclases par la méthode de Fédorof.* Compt. Rend. Soc. Phys. Hist. Nat. Genève, 1923, vol. 40, pp. 12-15.

Explains the advantages of the Fedorov method for determining the twin-laws of complicated twins, and gives examples of two individuals of a 'complex' occurring in juxtaposition, making the determination extremely difficult except by this method. When the curves connecting the orientation of twin-axes with regard to the principal vibration-directions are more accurate it may be possible to ascertain the effect of potash-felspar in the plagioclase. The Fedorov method gives a point referred to three co-ordinates and it is possible by means of such a projection to establish relations with the composition of an isomorphous mixture of three components, which can never be realized with curves plotted on two axes. The use of a Wright sensitive plate and a cap analyser is recommended for obtaining with greater precision the positions of extinction and of the twin-planes. W. C. S.

REINHARD (Max). *Données complémentaires pour la détermination des plagioclases par la méthode théodolite.* Schweiz. Min. Petr. Mitt., 1924, vol. 4, pp. 2-15, 1 pl.

For the determination of the composition of plagioclase feldspars one can utilize, in addition to the angles between the poles of principal vibration-directions and the twin-axes, various angles between optic axes. These may be either an angle between the two axes of different kinds, e. g. A and B in the simple individual; or A and B' in individuals of a twin; or an angle between two axes of the same kind, e. g. A and A' in two individuals; or the angle between the optic axial planes in two individuals of a twin. In a plagioclase twinned on both albite and Carlsbad laws there would be twelve possible angles of this kind. Data for the construction of curves are given correlating all the angles between optic axes and the angles between optic axial planes with the composition of the plagioclase. The determination of the various angles is obtained simply from one of three stereographic projections for which the

data for plotting are given. These projections are: (1) normal to the edge $[100,010]$, used for albite-Carlsbad-A twins; (2) normal to the edge $[001,100]$, used for Manebach, acline-A, and pericline twins; (3) normal to the edge $[001,010]$, used for Manebach-Ala-A, albite-Ala-B, and Baveno twins. The use of these diagrams is recommended in preference to the projection on the principal vibration-directions used hitherto, and the method of referring measurements made on the Fedorov stage to these projections is explained. W. C. S.

HERRMANN (Ernst). *Über Zwillingsverwachsungen gesteinsbildender Plagioklase*. Zeits. Krist., 1924, vol. 59, pp. 513-547, 1 pl., 3 text-figs.

In the course of research on a collection of rocks from the Arabian desert, Egypt, a large number of twins of plagioclase have been determined by the Fedorov method and, as a check, the approximate values for α and γ have been measured on the same crystals by the immersion method. Measurements have also been made on feldspar in the diorite of Unter-Kainsbach, Odenwald, Hesse, and in a gabbro from Volpersdorf, Silesia. The measurements on 86 crystals are tabulated. For the rocks examined the most frequent twin-laws are: albite in 36 % of the crystals measured, La Roc Tourné 24 %, Carlsbad-A 17 %. Other twin laws recorded are pericline, Manebach, Esterel, the complex $\perp [100] \parallel (010)$, and three others observed only once: viz. $\perp [100] \parallel (010)$; $\perp (100)$; and $\perp [010] \parallel (100)$. [The last two have not been recorded elsewhere. They are based on rather unsatisfactory measurements in one section.] Crystals twinned on only one law ('einfacher Zwillings' of Carstens, M.A. 2-434) were determined in the diorite of Unter-Kainsbach, and it was found that albite and La Roc Tourné twins had an average composition of 72.5 and 73.3 % An, while the only 'single' Carlsbad twin measured had the composition 81 % An. In the gabbro of Volpersdorf 'single' twins were found to have the following average composition: albite twin $82\frac{1}{2} \pm 6$ % An, La Roc Tourné $77\frac{1}{2} \pm 9$ % An, pericline 75 ± 7 % An, the anorthite-content ranging from 68 to 88 %. W. C. S.

DUPARC (L.) & GYSIN (M.). *Sur la non concordance des données fournies pour les plagioclases par les méthodes de Michel Lévy et Fédoroff et de celles qui résultent de la détermination des indices de réfraction*. Compt. Rend. Soc. Phys. Hist. Nat. Genève, 1925, vol. 42, pp. 139-141.

The anorthite-content of crystals of andesine determined from extinction-angles on oriented sections and by the Fedorov method is as much as

10 % higher than the content deduced from determinations of refractive indices on the same crystals made by the Becke-line method. Attention is called to similar discrepancies observed in the results obtained by E. Herrmann [preceding abstract].

W. C. S.

GYSIN (M.). *Sur la présence de la macle de l'acline A dans les plagioclases.* Schweiz. Min. Petr. Mitt., 1925, vol. 5, pp. 128-146, 16 figs.

Theoretically there are three possible parallel hemitropes of plagioclase all with the same axis [010] as twin-axis. These are: pericline with a variable plane of association in the zone [001,100]; acline-A with (001) as plane of association, and acline-B with (100) as plane of association. The last has not been observed. If the curves of migration of the poles of the plane of pericline twinning and of (001) are plotted for a series of plagioclases on a stereographic projection referred to the three principal vibration-directions as axes, it is found that these curves approximately coincide for plagioclases with anorthite between 30 and 50 % but that they are distinct for more acid and for more basic feldspars. Thus for the intermediate feldspars it would not be possible to distinguish pericline and acline-A twins. The positions of the twin-planes of 39 plagioclases of varying basicity from a variety of igneous rocks have been determined by the Fedorov method. For five of the feldspars the poles of the twin-planes are found to lie about on the curve for (001) in a region, between 70 and 80 % An, a region in which this curve is quite distinct from the curve for the pericline twin. The existence of acline-A twins is thereby demonstrated. The poles of (010) for the 39 feldspars examined were also plotted. These are found to lie generally to the right of the curve for (010) as plotted in the original projection by Duparc and Reinhard.

W. C. S.

KOŁACZKOWSKA (Marja). *Badania mikroskopowe skaleni występujących w andezytach z Wzaru pod Czorsztynem, z uwzględnieniem nowych metod badania.*—*Études microscopiques des plagioclases provenant des andésites de Wzar tenant compte des nouvelles méthodes d'examen.* Arch. Min. Tow. Nauk. Warszaw. (Arch. Min. Soc. Sci. Varsovie), 1928, vol. 2 (for 1926), pp. 13-91 (Polish), pp. 86-90 (French résumé), 127 text-figs, 7 diagrams (in folder).

The feldspars in the andesites of Wzar, near Szczawnica, Poland, have been studied by the Fedorov method and adaptations of the method devised by M. Berek and by T. J. Woyno [M.A. 3-321]. A new method, based on the position of equal illumination of two individuals of a twin,

has been used for determining positions of twin-planes. The plagioclases vary from 59 to 69 % An, and are for the most part zoned. They are twinned on the albite, pericline, and Carlsbad laws; combinations of albite and Carlsbad, resulting in La Roc Tourné twins, are common. The author finds that La Roc Tourné twins have a real existence and do not merely occur as a resultant of albite-Carlsbad twins. In twins formed of three individuals there may be three arrangements according as the albite, Carlsbad, or La Roc Tourné twin appears as the resultant of the other two. If the twins involve four individuals there are nine possible groupings, examples of three of which have been found.

W. C. S.

DUPARC (L.) & GYSIN (M.). *Sur les propriétés optiques de l'anorthite synthétique.* Compt. Rend. Soc. Phys. Hist. Nat. Genève, 1926, vol. 43, pp. 7-9.

Brief résumé of the results of the research on synthetic anorthite prepared by Albert Brun. The complete data have been given in another publication [M.A. 3-380].

W. C. S.

X-rays and Crystal-structure.

GRUNER (John W.). *The oscillation method of X-ray analysis of crystals.* Amer. Min., 1928, vol. 13, pp. 125-141, 12 figs.

The oscillation method [M.A. 3-333], in which the crystal is turned to and fro about 30° about an axis perpendicular to a beam of monochromatic X-rays, is explained. The co-ordinates of the spots recorded on the photographic plate are used for projecting a 'reciprocal lattice' [M.A. 1-218] from which the indices of the reflecting planes can be read off directly. The geometry of the method is dealt with in some detail.

L. J. S.

ASTBURY (W. T.). *A simple radioactive method for the photographic measurement of the integrated intensity of X-ray spectra.* Proc. Roy. Soc. London, Ser. A, 1927, vol. 115, pp. 640-657, 5 figs.

It is shown how the expensive light-sensitive cell, an essential in the determination of the intensity distribution in X-ray crystal photographs, may be replaced by a simple α -ray electroscope. The photographic plate is replaced by a carbon print and the intensities of the lines compared by measuring the intensity of α -ray ionization produced in the electroscope after α -rays from a polonium source have passed through the carbon print. By constructing a wedge from known thicknesses of aluminium foil and

making two exposures of 20 and 25 minutes respectively a double wedge print was produced the observed relative intensities of which compared very favourably with the calculated values. By suitable arrangements the apparatus gives a relation between X-ray intensity and α -ray intensity approximately linear through the origin. A method, based on this property, of determining the integrated intensity of X-ray spectra is outlined, and the author concludes with a detailed account of the preparation of carbon prints for this work.

F. A. B.

VEGARD (L.) & DALE (Hjalmar). *Untersuchungen über Mischkristalle und Legierungen*. Zeits. Krist., 1928, vol. 67, pp. 148-162, 5 figs.

The law of change in the size of the unit cell as the percentage composition varies was investigated for certain isomorphous mixtures and alloys. The mixture $\text{Pb}(\text{NO}_3)_2$ - $\text{Ba}(\text{NO}_3)_2$ can exist in every proportion and the length of the unit cell varies according to the additive law. The same applies to the alloy Cu-Ni, and (approximately) to Cu-Au. No mixed crystals are formed by NaBr and NH_4Br . For the alloy Cu-Co a cubic space-lattice was found, the composition being restricted to less than 13 % or more than 92 % of cobalt. Pure cobalt has a hexagonal lattice.

H. H.

GOLDSCHMIDT (V. M.). *Ueber die Raumerfüllung der Atome (Ionen) in Kristallen und über das Wesen der Lithosphäre*. Neues Jahrb. Min., Abt. A, 1928, Beil.-Bd. 57, pp. 1119-1130, 2 figs.

The proportion of space occupied by the various atoms in several salts of the NaCl type is considered; and it is pointed out that approximately 90 % of the volume of the earth's crust is allotted to the oxygen atoms.

H. H.

TERTSCH (Hermann). *Zur Raumerfüllung der Kristallgitter*. Tschermaks Min. Petr. Mitt., 1928, vol. 39, pp. 1-7, 2 figs.

The hypothesis is suggested that the non-miscibility of elements with similar lattices of approximately the same size, as in the case of gold and aluminium, may point to difference in space-portioning of the atom's sphere of influence.

H. H.

TERTSCH (H.). *Raumerfüllungsfragen*. Neues Jahrb. Min., Abt. A, 1928, Beil.-Bd. 57, pp. 63-88, 4 figs.

A discussion of the probable division of space between the elements and ions in the crystal-structure of NaCl, CsCl, and other well-known salts.

H. H.

WEISS (H.). *The application of X-rays to the study of alloys.* Proc. Roy. Soc. London, Ser. A, 1925, vol. 108, pp. 643-654, 1 fig.

The cell dimensions of the α -bronzes (Cu-Sn alloys) and the silver-gold alloys are measured by the powder-photograph method. The size of the cell varies for pure copper to saturated α -bronze (about 10 % Sn) in a continuous and almost linear manner. The author also finds that over the whole range of silver-gold alloys the cell-size varies continuously from that for silver to that for gold. For both series of alloys the lattice is face-centred cubic. An accuracy of 0.1 % only is claimed for these photographic determinations owing to irregular expansion and contraction of the film during development, &c. To this latter source of error are attributed the conflicting results of McKeehan's work (Phys. Rev., 1922, vol. 20, p. 424). Density determinations made on α -bronzes melted in vacuo and free from blowholes do not agree either with the substitution or interstitial theory. The results suggest that one atom of tin takes the place of several atoms of copper.

F. A. B.

BRADLEY (A. J.) & THEWLIS (J.). *The crystal structure of α -manganese.* Proc. Roy. Soc. London, Ser. A, 1927, vol. 115, pp. 456-471, 3 figs.

The authors base their conclusions on the powder-method photographs of α -manganese obtained by Westgren and Phragmén [M.A. 3-244], who by using a precision camera had greatly increased the accuracy of the powder method. Pure α -manganese is so porous that a reliable density measurement is impossible. From data on material containing known quantities of impurities, however, the unit cell was concluded to contain 58 atoms (not 56, Westgren and Phragmén's value). The space-group was then fixed as T_d^2 and the structure was found to be based on a single body-centred cubic lattice, each lattice point being replaced by a cluster of atoms arranged in tetrahedral symmetry. The exact positions of the atoms were defined by five parameters evaluated by the authors; and they found the interatomic distances to vary from 2.25 to 2.95 Å., indicating the probable unequal distribution of electrons among the atoms. A close analogy exists between the structure of this element and that of the alloy γ -brass.

F. A. B.

PRESTON (G. D.). *The crystal structure of α -manganese.* Phil. Mag., 1928, ser. 7, vol. 5, pp. 1198-1206, 3 pls., 1 text-fig.

—— *The crystal structure of β -manganese.* Ibid., pp. 1207-1225, 1 pl., 1 text-fig.

Single crystals of α -manganese prepared by M. L. V. Gayler [Journ. Iron & Steel Inst., 1927, vol. 115, p. 393], were examined by Laue's

method, the oscillating crystal method, and the powder method. The results confirmed the work of Bradley and Thewlis (preceding abstract) and that of Westgren and Phragmén [M.A. 3-244].

β -manganese was prepared by Gayler by annealing the α -modification at 975°C . and quenching in water. Quenching inhibits the change back to α -manganese, which would take place at 742°C . on cooling slowly. The three methods used in studying α -manganese were successfully applied to the β -modification. The substance belongs to the cubic system and its space-group is O^7 or O^6 . The unit cell has a side of 6.29 \AA . and contains twenty atoms. The calculated density is 7.29 as compared with 7.45 , the experimental value for α -manganese powdered crystals.

F. A. B.

HALLA (F.) & STAUFER (R.). *Röntgenographische Untersuchungen im System Blei-Thallium*. Zeits. Krist., 1928, vol. 67, pp. 440-454, 7 figs.

The mixture Pb-Tl has a maximum melting-point when 35 atom % of lead is present. Powder and Laue photographs were taken to discover whether this is due to the formation of a chemical combination of lead and thallium or not. The conclusion was that no such combination exists, for the structure of the mixture only differs from that of lead in having a cubic cell of length 4.871 instead of 4.924 \AA .

H. H.

POSNJAK (E.). *The crystal structure of potassium*. Journ. Physical Chem., 1928, vol. 32, pp. 354-359.

Previous attempts showed much scattering of the X-rays and the substance was thought to be amorphous; but apparently the crystals were too large for the powder method. Potassium was melted in a sealed capillary tube and quenched, and the tube was rotated during the exposure. The results show a body-centred cubic lattice with edge $a = 5.333\text{ \AA}$. Sodium and lithium examined by the same method gave 4.30 and 3.51 \AA . respectively.

L. J. S.

MACHATSCHKI (Felix). *Über die Kristallstruktur des blättrigen Dyskrasites von Andreasberg (Harz) und der künstlich dargestellten Legierung Ag_3Sb* . Zeits. Krist., 1928, vol. 67, pp. 169-176.

Powder X-ray photographs of dyscrasite are identical with those of artificial Ag_3Sb . They indicate a unit cell with hexagonal symmetry containing two atoms and having dimensions $a = 2.984$, $c = 4.803\text{ \AA}$.

H. H.

GOßNER (B.) & MUßGNUG (F.). *Über die Kristallstruktur von Zinnober und Covellin.* Centr. Min., Abt. A, 1927, pp. 410-413.

Cinnabar from Almaden, Spain, gave by the rotating-crystal method $a = 4.17$, $c = 9.50$ Å. ($c/a = 2.29$) with three molecules HgS in a cell of rhomb-shaped base. The space-group is D_3^4 or D_3^6 , as in quartz. Covelline from Alghero, Sardinia, gave $a = 3.81$, $c = 16.46$ Å. ($c/a = 4.32$) with six molecules CuS in a hexagonal cell. A Laue diagram shows full hexagonal symmetry and the space-group is probably D_{6h}^4 . The positions of the atoms are stated. L. J. S.

OFTEDAL (Ivar). *Die Kristallstruktur von Skutterudit und Speiskobalt-Chloanthit.* Zeits. Krist., 1928, vol. 66, pp. 517-546, 6 figs.

Powder and Laue photographs give the space-group T_h^5 for skutterudite. The unit cell has an edge of 8.189 Å. and contains eight molecules of CoAs_3 . Smaltite and chloanthite have the same structure, but the unit cell is slightly larger. They may be merely impure forms of skutterudite, and the existence of a cubic modification of $(\text{Co}, \text{Ni})\text{As}_2$, isomorphous with pyrite, appears to be doubtful. H. H.

GOßNER (B.) & MUßGNUG (F.). *Über die Kristallstruktur von Pyrargyrit.* Centr. Min., Abt. A, 1928, pp. 65-73, 1 fig.

Crystals of pyrargyrite from Zacatecas, Mexico, examined by the rotating-crystal method in X-rays gave a unit rhombohedral cell, corresponding with the primary rhombohedron (100), of edge $a = 7.07$ Å. and axial angle $\alpha 104^\circ 1'$, containing two molecules Ag_3SbS_3 . The space-group is C_{3v}^6 , and the position of the atoms is determined. L. J. S.

PALACIOS (J.). *Sobre la estructura cristalina de la tetraedrita.* Anal. Soc. Españ. Fís. Quím., 1927, vol. 25, pp. 246-251.

A crystal of tetraedrite from Hungary gave by the spectrometer X-ray method the dimensions of the unit cube $a = 10.39$ Å. containing four molecules $3\text{Cu}_2\text{S} \cdot \text{Sb}_2\text{S}_3$. The calculated density is 4.803. The X-ray method is thus helpful in deciding between the alternative formulae that have been proposed for this mineral (also $4\text{Cu}_2\text{S} \cdot \text{Sb}_2\text{S}_3$). The powder method gave less satisfactory results. [Cf. M.A. 3-426.]

L. J. S.

OTT (H.) & SEYFARTH (H.). *Die Struktur des Silbersubfluorids Ag_2F .* Zeits. Krist., 1928, vol. 67, pp. 430-433, 2 figs.

Silver sub-fluoride has a structure of the CdI_2 type. The unit cell contains one molecule of Ag_2F and has the dimensions $a = 3.0$, $c = 5.74$ Å.

H. H.

MENZER (G.). *Die Kristallstruktur von Kryolithionit*. Fortschr. Min. Krist. Petr., 1927, vol. 12, pp. 58-59; Centr. Min., Abt. A, 1927, pp. 382-383; Zeits. Krist., 1928, vol. 66, pp. 457-458.

Cryolithionite, $\text{Na}_3\text{Li}_3\text{Al}_2\text{F}_{12}$, crystallizes as rhombic-dodecahedra and thus presents a similarity to garnet ($\text{Ca}_3\text{Al}_2\text{Si}_3\text{O}_{12}$). X-ray powder photographs of material from Ivigtut, Greenland, show the same type of structure as garnet, with Li-atoms in the positions of the Si-atoms. The cubic lattice is body-centred and the space-group O_h^{10} . The unit cell of edge $a = 12.10 \text{ \AA}$. contains eight molecules $\text{Na}_3\text{Li}_3\text{Al}_2\text{F}_{12}$. Cryolite (monoclinic, but pseudo-cubic) even when examined at the ordinary temperature shows a structure near that of the garnet type, suggesting that the formula should be written Na_3AlF_6 rather than $3\text{NaF} \cdot \text{AlF}_3$.

L. J. S.

WYCKOFF (Ralph W. G.) & DENNIS (L. M.). *The crystal structure of ammonium hexachloroplumbate* $[(\text{NH}_4)_2\text{PbCl}_6]$. Amer. Journ. Sci., 1926, ser. 5, vol. 12, pp. 503-509, 1 fig.

Powder photographs of minute optically isotropic crystals show the same type of atomic arrangement as for $(\text{NH}_4)_2\text{PtCl}_6$. The unit cube of edge 10.14 \AA . contains four molecules. The calculated density is 2.89.

L. J. S.

SCHMAELING (Valerian). *Berechnung der Parameter eines Ionengitters vom Korundtyp*. Zeits. Krist., 1928, vol. 67, pp. 1-28, 2 figs.

Assuming that the lattice of corundum consists of rigid, spherical ions, the potential energy of the medium is calculated; both on the hypothesis that there exist two independent parameters and also on the assumption that there is only one. The values of the parameters obtained by making the energy a minimum in accordance with M. Born's theory, and using the physical constants as given by the compressibility, are in good agreement with experimental results.

H. H.

GOTTFRIED (C.). *Über die Struktur des β -Korunds*. Fortschr. Min. Krist. Petr., 1927, vol. 12, pp. 34-35; Centr. Min., Abt. A, 1927, pp. 378-379; Zeits. Krist., 1928, vol. 66, pp. 487-488.

— *Über den Feinbau des β -Korunds*. (Vorläufige Mitteilung.) Zeits. Krist., 1928, vol. 66, pp. 393-398, 2 figs.

A preliminary investigation by X-rays of β -corundum (Al_2O_3 96.59, Na_2O 2.56 %, &c.) gave refractive index 1.68, density 3.30, and oxygen-atom-volume 17.25 cubic \AA ., as against 1.768 and 14.05 for α -corundum, pointing to a closest-packed arrangement for the latter and an open

structure for the β -modification. The Laue diagram shows a hexagonal axis with six planes of symmetry. The unit cell of dimensions $a = 5.63$, $c = 22.63 \text{ \AA}$. ($c/a = 4.02$) contains twelve molecules of Al_2O_3 . H. H.

ZACHARIASEN (William). *Über die Kristallstruktur von Bixbyit, sowie vom künstlichen Mn_2O_3* . Zeits. Krist., 1928, vol. 67, pp. 455-464, 1 fig.

Laue and powder photographs give for bixbyite the sesquioxide structure with space-group T_6 , and a unit cell containing 16 molecules and having an edge of 9.35 \AA . It follows that the formula for bixbyite is $(\text{Fe}, \text{Mn})_2\text{O}_3$ rather than FeMnO_3 . Artificial Mn_2O_3 has the same structure with a unit cell of edge 9.41 \AA . H. H.

TOKODY (L.). *Über die Kristallstruktur des Chromites von Tiszafu (Tiszovicza, Komitat Krassó-Szörény, Ungarn)*. Zeits. Krist., 1928, vol. 67, pp. 338-339.

Debye-Scherrer photographs gave for chromite a space-group O_h^7 with a unit cell containing eight molecules and an edge of 8.05 \AA . H. H.

HARANG (Leiv). *Über die Kristallstruktur der tetragonalen Verbindungen AgClO_3 und AgBrO_3* . Zeits. Krist., 1928, vol. 66, pp. 399-407.

Powder and rotation X-ray methods showed that silver chlorate and silver bromate have D_{4h}^{17} as space-group. The unit cell contains eight molecules and has $a = 8.49$, $c = 7.91 \text{ \AA}$. in the case of AgClO_3 , and $a = 8.59$, $c = 8.08 \text{ \AA}$. in the case of AgBrO_3 . H. H.

BÜSSEM (W.) & HERRMANN (K.). *Röntgenographische Untersuchung der einwertigen Perchlorate*. Zeits. Krist., 1928, vol. 67, pp. 405-408.

The salts NH_4ClO_4 , KClO_4 , RbClO_4 , CsClO_4 , TlClO_4 belong to the space-group V_h^{16} . H. H.

FRICKE (R.) & HAVESTADT (L.). *Die Kristallstruktur von $\text{BeSO}_4 \cdot 4\text{H}_2\text{O}$* . Zeits. Anorg. Chem., 1928, vol. 170, pp. 35-41.

This is holohedral tetragonal of the space-group D_{4h}^{18} . The unit cell of dimensions $a = 8.03$, $c = 10.75 \text{ \AA}$. contains four molecules. L. J. S.

GOSSNER (B.). *Ueber die Kristallstruktur von Glaserit und Kalium-sulfat*. Neues Jahrb. Min., 1928, Beil.-Bd. 57, pp. 89-116, 3 figs.

Crystals of aplthitalite [= glaserite, but whether natural or artificial crystals not stated] gave by the rotating-crystal method $a = 5.65$, $c = 7.29 \text{ \AA}$., the cell with rhombic base containing two molecules $\text{NaK}_3(\text{SO}_4)_2$. The Laue diagram shows trigonal symmetry and the space-group is D_{3d}^{34} . Potassium sulphate, interchanging the usual a and b axes, gave $a = 10.06$,

$b = 5.85$, $c = 7.33$ Å. with four molecules K_2SO_4 in the cell. Space-group V_{h}^{13} . The similarity in structure of the two salts is compared.

L. J. S.

AMINOFF (G.) & PARSONS (A. L.). *Symmetry and lattice constants of finnemanite and mimetite*. Geol. Förh. Stockholm, 1927, vol. 49, pp. 438-440.

The Laue pattern on (0001) of finnemanite [M.A. 2-147] shows only a hexagonal axis of symmetry, and the class may be either bipyramidal hemihedral, as in mimetite, or pyramidal hemihedral (nepheline class). By the rotating-crystal method the dimensions of the hexagonal cell were determined, for finnemanite $a = 10.21$, $c = 6.97$ Å. ($c/a = 0.688$) and for mimetite $a = 10.01$, $c = 7.28$ Å. ($c/a = 0.727$), the cells containing one molecule $9PbO.3As_2O_5.PbCl_2$ and $9PbO.3As_2O_5.PbCl_2$ respectively. Although the lattice dimensions are very nearly the same, there are differences in the intensities of the spots, perhaps due to the arrangement of the oxygen atoms.

L. J. S.

VEGARD (L.). *Bemerkungen zu einer Arbeit von R. W. G. Wyckoff und Sterling B. Hendricks über die Kristallstruktur von Zirkon*. Zeits. Krist., 1928, vol. 67, pp. 482-484.

The author replies to criticisms made by Wyckoff and Hendricks [M.A. 3-432] of his work on the crystal-structure of zircon, deals with the question of priority, and points out that the discrepancies referred to by the critics are merely due to a misinterpretation of his results.

H. H.

VALETON (J. J. P.). *Über die Struktur des Benitoits*. Fortschr. Min. Krist. Petr., 1927, vol. 12, pp. 91-92; Centr. Min., Abt. A, 1927, 387-388; Zeits. Krist., 1928, vol. 66, pp. 496-497.

Benitoite examined by the spectrometer method gave $a = 6.64$, $c = 9.71$ Å. ($c/a = 1.463$, i.e. twice the crystallographic value) with two molecules $BaTiSi_3O_9$ in the parallelepiped cell. The space-group is D_{3h}^{24} or D_{3h}^{24} . Similar results were given by the rotating-crystal method, but the I and III layer-lines are very faint, and they were overlooked by Gossner and Mussgnug [M.A. 3-434].

L. J. S.

TAYLOR (W. H.) & WEST (J.). *The crystal structure of the chondrodite series*. Proc. Roy. Soc. London, Ser. A, 1928, vol. 117, pp. 517-532, 4 figs.

The minerals chondrodite, humite, and clinohumite were examined by the rotating-crystal method and the ionization spectrometer. Humite

has the space-group V_{h}^{16} with a unit cell containing four molecules $\text{Mg}(\text{F},\text{OH})_2 \cdot 3\text{Mg}_2\text{SiO}_4$. Chondrodite and clinohumite have the space-group $C_{2h}^{5/2}$ (possibly $C_{2h}^{4/2}$), while the unit cell contains two molecules, $\text{Mg}(\text{F},\text{OH})_2 \cdot 2\text{Mg}_2\text{SiO}_4$ and $\text{Mg}(\text{F},\text{OH})_2 \cdot 4\text{Mg}_2\text{SiO}_4$ respectively. Details of the arrangement of the atoms in the unit cell are worked out on the supposition that the Mg_2SiO_4 portion of these minerals possesses the olivine structure, and that the crystals are composed of alternate layers of $\text{Mg}(\text{OH})_2$ and olivine in the proportions represented by the chemical formulae

H. H.

CARDOSO (Gabriel Martin). *Röntgenographische Feinbaustudien am Cyanit und Staurolith*. Fortschr. Min. Krist. Petr., 1927, vol. 12, pp. 18-20; Centr. Min., Abt. A, 1927, pp. 384-387; Zeits. Krist., 1928, vol. 66, pp. 485-487.

The axial angle α of kyanite is $90^\circ 51'$ and a Laue photograph through the face (100) shows a pseudo-rhombic arrangement of the spots. The zone-axis [411] is very nearly perpendicular to (100), and taking this as the a -axis the axial angles become $\alpha 90^\circ 51'$, $\beta 90^\circ 5'$, $\gamma 90^\circ 27'$. By the rotating-crystal method the unit cell has dimensions $a = 7.122$, $b = 7.883$, $c = 5.650 \text{ \AA}$., with four molecules in the cell. Referring these dimensions to the new pseudo-rhombic axes $a' = 26.868$ (from $d_{(100)} = 6.717 \times 4$), $b' = 7.883$, $c' = 5.650 \text{ \AA}$. A direct measurement with a cylinder cut with its axis parallel to [411] gave $a' \doteq 27.15 \text{ \AA}$. Measurements were also made on a parallel growth of kyanite and staurolite (in which (100) of kyanite is parallel to (010) of staurolite and the c -axes are parallel; also [411] of kyanite is near the b -axis of staurolite) gave for staurolite $a = 7.81$, $b = 16.59$, $c = 5.64 \text{ \AA}$., corresponding respectively with b' , $\frac{2}{3}a'$, and c' of kyanite, the unit cell containing four molecules $\text{HFeAl}_5\text{Si}_2\text{O}_{13}$ (Penfield's formula).

L. J. S.

GOßNER (B.). *Die Gitterkonstanten von Skapolith und Apophyllit*. Centr. Min., Abt. A, 1927, pp. 338-342.

The author's method of deducing the size of a silicate molecule from X-ray results [M.A. 3-434] is here adopted. In the case of scapolite the ratio 3 plagioclase : 1 chloride, &c., seems unlikely on crystallographic grounds. Scapolite, as colourless crystals from Grass Lake [St. Lawrence Co., New York] gave by goniometric measurement $a : c = 1 : 0.4431$, and analysis (mean of two by C. Brückl) $\text{SiO}_2 52.44$, $\text{Al}_2\text{O}_3 23.34$, $\text{CaO} 10.90$, $\text{Na}_2\text{O} 7.72$, $\text{K}_2\text{O} 1.45$, $\text{SO}_3 0.37$, $\text{Cl} 2.19$, $\text{CO}_2 1.87$, with small amounts H_2O , FeO , MgO ; sp. gr. 2.650. Examined by the rotating-crystal method the unit cell has dimensions $a = 17.26$, $c = 7.65 \text{ \AA}$., and the

space-group is $C_{4h}^{5/2}$. Taking the molecular ratios of 4 plagioclase (0.200 $\text{NaAlSi}_3\text{O}_8$, 0.105 $\text{CaAl}_2\text{Si}_2\text{O}_8$, 0.030 $\text{Na}_2\text{Al}_2\text{Si}_2\text{O}_8 = 0.335$) to 1 chloride, &c., (0.042 CaCO_3 , 0.031 CaCl_2 , 0.005 CaSO_4 , 0.006 $\text{CaO} = 0.084$), three (2.94) molecules of mol. wt. 1249.3 are contained in the unit cell. Apophyllite from Paterson [New Jersey] gave a unit cell $a = 12.71$, $c = 15.86$ Å. with two molecules $8\text{SiO}_3\text{Ca}[\text{SiO}_4\text{K}_2\text{H}_2.7\text{SiO}_4\text{H}_4].4\text{H}_2\text{O}$.

L. J. S.

GRUNER (John W.). *The use of the oscillation method in determining the structure of analcite*. Amer. Min., 1928, vol. 13, pp. 174-194, 11 figs.

Analcime from the Cyclopean Islands examined by the oscillating-crystal method about the axes [100], [110], and [111] is shown to be holohedral cubic with a body-centred lattice and space-group O_h^9 (or possibly O_h^{10}). There is no suggestion that the mineral is pseudo-cubic to correspond with the optical anomalies. Powder photographs give $a = 13.64$ Å. as the edge of the unit cube containing sixteen molecules of $\text{NaAlSi}_2\text{O}_6 \cdot \text{H}_2\text{O}$.

L. J. S.

WYCKOFF (Ralph W. G.). *The crystal structure of the tetramethyl ammonium halides*. Zeits. Krist., 1928, vol. 67, pp. 91-105, 8 figs.

On the assumption that four carbon atoms are associated with each nitrogen atom the space-group $4Di-7$ is assigned to the tetragonal crystals $\text{N}(\text{CH}_3)_4\text{I}$, $\text{N}(\text{CH}_3)_4\text{Br}$, and $\text{N}(\text{CH}_3)_4\text{Cl}$. The unit cell contains two molecules and has dimensions $a = 7.96$ and $c = 5.75$ Å., $a = 7.76$ and $c = 5.53$ Å., $a = 7.78$ and $c = 5.53$ Å. for the three substances respectively.

H. H.

HENDRICKS (Sterling B.). *The crystal structures of the monomethyl ammonium halides*. Zeits. Krist., 1928, vol. 67, pp. 106-118, 4 figs.

The monomethyl ammonium bromide, iodide, and chloride crystallize in the tetragonal system. The bromide and iodide have similar structures. Their unit cell contains two molecules of $\text{NH}_3\text{CH}_3\text{Br}$ or $\text{NH}_3\text{CH}_3\text{I}$; it has respectively the dimensions $a = 5.09$, $c = 8.76$ Å. and $a = 5.11$, $c = 8.97$ Å. The unit cell of the chloride contains one molecule $\text{NH}_3\text{CH}_3\text{Cl}$ and has the dimensions $a = 4.28$, $c = 5.13$ Å.

H. H.

HENDRICKS (Sterling B.). *The crystal structure of monoethyl ammonium bromide and iodide*. Zeits. Krist., 1928, vol. 67, pp. 119-130, 5 figs.

The monoethyl ammonium bromide and iodide, $\text{NH}_3\text{C}_2\text{H}_5\text{Br}$ and $\text{NH}_3\text{C}_2\text{H}_5\text{I}$, have similar monoclinic units of structure containing two

molecules each. Their dimensions are respectively $a = 4.63$, $b = 8.32$, $c = 6.24$ Å. with $\beta = 86^\circ 59'$, and $a = 4.81$, $b = 8.68$, $c = 6.63$ Å. with $\beta = 87^\circ 54'$. The structure of $\text{NH}_3\text{C}_2\text{H}_5\text{Cl}$ is probably similar, but has not been completely analysed. H. H.

HENDRICKS (Sterling B.). *The crystal structure of the tri-ethyl ammonium halides.* Zeits. Krist., 1928, vol. 67, pp. 472-481, 4 figs.

The space-group of $\text{NH}(\text{C}_2\text{H}_5)_3\text{X}$ was determined by Laue and spectrum photographs to be $6c-4$. The unit cell contains two molecules, and has dimensions: when X is Cl, $a = b = 8.38$, $c = 7.08$; when X is Pr, $a = b = 8.56$, $c = 7.49$; and when X is I, $a = b = 8.78$, $c = 7.74$ Å. H. H.

HENDRICKS (Sterling B.). *The crystal structure of the n-mono-propyl ammonium halides.* Zeits. Krist., 1928, vol. 67, pp. 465-471, 2 figs.

Laue and spectrum photographs show that the tetragonal unit cell of $\text{NH}_3\text{C}_3\text{H}_7\text{X}$ contains one molecule and has dimensions: when X is Cl, $a = b = 4.48$, $c = 7.40$; when X is Pr, $a = b = 4.57$, $c = 7.36$; and when X is I, $a = b = 4.85$, $c = 7.33$ Å. H. H.

GERSTÄCKER (A.), MÖLLER (H.), & REIS (A.). *Röntgenographische Untersuchung einiger triklin-pinakoidaler Kristallarten.* Zeits. Krist., 1928, vol. 66, pp. 421-433, 3 figs.

Some triclinic crystals with a centre of symmetry were submitted to X-ray analysis in order to find how many molecules were contained in the smallest possible unit cell. Two molecules of $\text{C}_4\text{H}_6\text{O}_6 \cdot \text{H}_2\text{O}$, $\text{C}_4\text{H}_6\text{O}_6$, and $\text{C}_3\text{O}_4\text{H}_4$ were found in the case of the hydrated racemic acid, non-hydrated racemic acid, and malonic acid respectively. For potassium persulphate one molecule of $\text{K}_2\text{S}_2\text{O}_8$ was obtained. H. H.

REIS (A.). *Über den Bau der triklin-pinakoidalen Kristalle und über Racematbildung.* Zeits. Krist., 1928, vol. 66, pp. 417-420.

Reasons are given for thinking that bimolecular associations forming racemates with central symmetry form one of the commonest types of crystalline material. H. H.

BURGERS (W. G.). *An X-ray investigation of optically anomalous crystals of racemic potassium chlorosulphoacetate.* Proc. Roy. Soc. London, Ser. A, 1927, vol. 114, pp. 222-229, 1 pl., 1 text-fig.

Jaeger found that this substance crystallizes in the orthorhombic system and yet its optic picture in convergent light shows strong crossed

dispersion. From this and other anomalies he concluded that the crystals are built up of perpendicularly crossed monoclinic lamellae [Proc. K. Akad. Wetensch. Amsterdam, 1925, vol. 28, p. 423]. The author tests this conclusion by preparing Laue photographs and oscillation photographs about different zone-axes. The unit cell has edges $a = 8.58$, $b = 8.60$, $c = 23.76$ Å. The observed density of a small crystal (suspension method) is 2.09, thus revealing the contents of the cell to be eight groups of $\text{COOK} \cdot \text{CHCl} \cdot \text{SO}_3\text{K} + 1\frac{1}{2}\text{H}_2\text{O}$. The space-group is shown to be $Q^{1\frac{1}{2}}_h$ and the underlying lattice Γ_0 . There is no doubt that the crystals are truly orthorhombic; the optical anomalies may be due to strains in the crystals not large enough to affect the Laue photographs. Irregularities of crystal habit must be attributed to slight differences in the orientation of successively crystallized layers.

F. A. B.

GERSTÄCKER (A.), MÖLLER (H.), & REIS (A.). *Über den Kristallbau des Pentaerythrit-Tetraacetates und -Tetranitrates*. Zeits. Krist., 1928, vol. 66, pp. 355–392, 1 pl., 5 text-figs.

Pentaerythritol tetraacetate has density 1.213 and forms transparent, colourless crystals with good cleavage along (001) and (110). Experiments with Weissenberg's Röntgen-goniometer gave $C^{3/4}_h$ as space-group with a unit cell having $a = 12.18$ and $c = 5.58$ Å., and containing two molecules of $\text{C}_{13}\text{H}_{20}\text{O}_8$. Pentaerythritol tetranitrate has density 1.773 and forms crystals with moderate cleavage along (110). Its space-group is V^4_d ; while its unit cell has $a = 9.38$, $c = 6.69$ Å., and contains two molecules of $\text{C}_5\text{H}_8\text{O}_{12}\text{N}_4$.

H. H.

NEHMITS (A.). *Zur Kristallstruktur des Pentaerythrit*. Zeits. Krist., 1928, vol. 66, pp. 408–416, 6 figs.

Laue photographs, and experiments on the rate of growth and solution of pentaerythritol point to the fact that crystals of this substance do not have a polar axis, as is usually supposed, but belong to the space-group S^2_4 .

H. H.

Meteorites and Tektites.

SCHWINNER (Robert). *Meteoriten und Geologie*. Gerlands Beiträge zur Geophysik, Leipzig, 1927, vol. 16, pp. 195–222.

Based on the paths and velocities of falling meteorites and on their absence as fossils in geological strata, the author concludes that the material is not of the solar system, but that it comes from a cosmic cloud which the solar system entered during the Quaternary period. This extremely thin cosmic cloud is supposed to have been formed by the

collision of two heavenly bodies 10^{10} to 10^{11} years ago. Although the range from iron to stones may represent the variations in composition due to differentiation along a cross-section of a once fluid heavenly body, this is not necessarily the same in the case of the earth. Tektites are discussed, but as to their origin our author here fails. L. J. S.

LÖNNQVIST (Conrad). *Versuch einer Deduktion der Frequenz der Meteoriten*. Arkiv Mat. Astron. Fysik, K. Svenska Vetenskapsakad. Stockholm, 1924, vol. 18, no. 25, 39 pp., 13 figs.

Astronomical calculations and deductions from statistics of the times (hours and months) of fall of meteorites. L. J. S.

[LEVINSON-LESSING (F. Y.) & TURTZEV (A. A.)] LOEWINSON-LESSING (F.) and TURCEV (A.) (TOURTZEFF (A.)). *On the magnetic properties of some stony meteorites*.—Левинсон-Лессинг (Ф. Ю.) и Турцев (А. А.). О магнетизме некоторых каменных метеоритов. Докл. Акад. Наук СССР (Compt. Rend. Acad. Sci. URSS), 1928, pp. 177–180, 1 fig. [English.]

Nearly all the meteoric stones examined were found to be feebly magnetic with polarity. In the field of a permanent magnet they acquired a much higher degree of magnetization. Specimens heated to various temperatures and cooled in the earth's magnetic field showed varying degrees of magnetization, according to the temperature of the heating, with a maximum at 800°C . for the Pultusk stone. The results suggest that the temperature of the meteorites at the time of their fall (when they came under the influence of the earth's magnetism) could not have exceeded $300\text{--}500^{\circ}\text{C}$. L. J. S.

LEONHARDT (J.). *Die morphologischen und strukturellen Verhältnisse der Meteoreisen im Zusammenhang mit ihrem Entwicklungsgang*. Fortschr. Min. Krist. Petr. 1927, vol. 12, pp. 52–55; Centr. Min., Abt. A., 1927, pp. 432–435; Zeits. Krist., 1928, vol. 66, pp. 449–452. [The full paper to be published in . . .]

Kamacite from various meteoric irons examined by the powder and rotating-crystal X-ray methods shows a body-centred lattice with edge $a = 2.84 \text{ \AA}$. Laue photographs show, however, that they fall into two groups: (1) with diffused spots ('asterism'), e.g. Toluca, Elbogen, Campo del Cielo, &c., representing paramorphs after α -iron; (2) showing normal spots, e.g. Braunau, Holland's Store, Youndegin, representing single homogeneous crystals due to re-crystallization and slower cooling. Formulae are given for calculating the orientation of sections from the

angles of the Widmanstätten figures, and for the orientation of Laue photographs. Cubic cleavage was determined in Braunau; and the Neumann lines are shown to be parallel to faces of (112). L. J. S.

SHANNON (Earl V.). *The oxidation of meteoric irons with comparative descriptions of two new examples of magnetic iron oxides from terrestrial sources.* Proc. U.S. Nat. Mus., 1927, vol. 72, art. 21, 15 pp.

Analysis of the 'iron shale' from Cañon Diablo, Arizona, gave I. The 31.89 % of magnetite and trevorite is sufficient to explain the magnetic character of the material. The magnetic portion of the scale of the Cape York, Greenland, meteoric iron gave II. A much oxidized mass (18½ kilos) of iron oxides, presumably of meteoric origin, from Coldwater, Comanche Co., Kansas, gave III. An iron-ochre of unknown origin and said to be from Durant, Oklahoma, is red-brown and strongly magnetic with polarity; analysis IV. Martite from Cerro Mercado, Durango, Mexico, gave V. In the two last cases of terrestrial materials the magnetic character appears to be due to the magnetic form of ferric oxide [M.A. 3-217]: this was not detected in the weathered products of meteoric irons.

	Fe ₂ O ₃ .	FeO.	NiO.	H ₂ O.	Limonite, 2Fe ₂ O ₃ .3H ₂ O.	Magnetite, FeO.Fe ₂ O ₃ .	Trevorite, NiO.Fe ₂ O ₃ .	Haematite, Fe ₂ O ₃ .
I.	79.50	3.68	6.44	8.19	56.73	11.86	20.03	8.36
II.	65.97	9.52	6.78	12.44	32.94	30.68	21.09	—
III.	75.12	1.77	4.32	12.38	85.86	5.70	13.44	—
IV.	72.20	1.64	—	3.90	26.38	5.29	—	46.07
V.	80.72	2.58	—	1.36	9.42	8.81	—	66.93

L. J. S.

LACROIX (A.). *Les météorites tombées en France et dans ses colonies et conservées au Muséum national d'histoire naturelle, avec remarques sur la classification des météorites.* Bull. Mus. Hist. Nat. Paris, 1927, vol. 33, pp. 411-455.

The collection of meteorites in the Natural History Museum at Paris, after being in the department of Geology under A. Daubrée (1861-92) and S. Meunier (1892-1920), has now been transferred to the department of Mineralogy. It contains several specimens of historic interest. Regarding meteorites as igneous rocks, the following classification is proposed:

I. Sporadosiderites (aerolites).

1. Magnesio-calcic group. (a) Felspathic, (b) Non-felspathic.

2. Magnesian group. (a) Peridotite, (b) Pyroxeno-peridotite, (c) Pyroxenic.

II. Syssiderites (lithosiderites).

1. Magnesian group. (a) Peridotie, (b) Pyroxeno-peridotie, (c) Pyroxenic.
2. Magnesio-calcic group.

III. Holosiderites. (a) Mionickeliferous, (b) Plionickeliferous, (c) Nickelic.

Particulars are given of fifty (and five doubtful) meteorites fallen in France; these are also listed under years, months, and hours, and topographically. From the French colonies in Africa and Indo-China fourteen meteorites are listed.

L. J. S.

BØGGILD (O. B.). *The meteoric iron from Savik near Cape York, North-Greenland.* Meddel. om Grønland, 1927, vol. 74, pp. 11-30, 6 pls., 5 text-figs.

A fourth block of the Cape York meteoric iron (total known weight $43\frac{1}{2}$ tons) was found by the natives in 1913 on the Savik peninsula (9 and 13 km. from the places where the other masses were found). It weighed 3401.7 kg. (after cutting 3236 kg.), measuring 156×90 cm., and was transported to Copenhagen in 1925. Analysis by F. Kristensen gave Fe n.d., Ni 7.25, S 0.022, P 0.166, Cr trace, Si, C, Co, Cu nil; sp. gr. 7.91. Nodules and some streaks of troilite (0.65%) and small amounts of chromite and rhabdite are present. The structure is that of a medium octahedrite and the block consists of a single crystal individual. The orientation is discussed in detail. The *c*-axis of the rhabdite is parallel to the *a*-axes of the enclosing kamacite and (110) of the rhabdite parallel to (210) planes of the kamacite, giving six possible positions. This was first determined with etched spheres of the Coahuila iron measured on the goniometer. The kamacite bands show an oriented sheen in three positions.

L. J. S.

NIEUWENKAMP (W.). *The meteorite of Ellemeet (after that of Uden in 1840, and that of Blauwkapel in 1843, the third in the Netherlands).* Proc. Sect. Sci. K. Akad. Wetensch. Amsterdam, 1927, vol. 30, pp. 724-726, 1 fig. [See M.A. 3-393.]

MERRILL (George P.). *A recently found iron meteorite from Oakley, Idaho.* Proc. U.S. Nat. Mus., 1927, vol. 71, art. 21, 3 pp., 2 pls.

A mass of 112 [not 66] kilos was found in 1926 near Oakley, Cassia Co. It is a coarse octahedrite and is very similar to Cabin Creek in its external form. Analysis by E. V. Shannon gave Fe 92.374, Ni 7.038, Co 0.273, Cu 0.006, P 0.280, S 0.016, Mn, Cr, Pt nil, insol. 0.004 = 99.991.

L. J. S.

MERRILL (George P.). *Heretofore undescribed meteoric irons from* [1] *Bolivia, South America*, [2] *Western Arkansas*, and [3] *Seneca township, Michigan*. Proc. U.S. Nat. Mus., 1927, vol. 72, art. 4, 4 pp., 2 pls.

Bolivia.—This is a complete individual weighing 21.25 kilos from the F. A. Canfield collection. It etches badly and is a kamacite octahedrite. Analysis I by E. V. Shannon.

Western Arkansas.—A triangular mass weighing 1.75 kilos also from the Canfield collection. It etches badly and the kamacite bands are finely granulated. Analysis II.

Seneca township.—A weathered mass of 11.5 kilos was found in 1923 in Lenawee Co., Michigan. The structure is that of a medium octahedrite. Analysis III.

	Fe.	Ni.	Co.	Cu.	Mn.	Pt.	S.	P.	insol.	Total.
I.	94.212	5.626	0.320	0.0004	nil	trace	0.014	0.261	0.042	100.4754
II.	94.858	5.121	0.353	0.013	trace	nil	0.009	0.020	0.013	100.387
III.	87.77	11.41	0.26	0.01	—	—	0.05	0.15	—	99.65

L. J. S.

MERRILL (George P.). *On newly discovered meteoric irons from the Wallapai (Hualapai) Indian Reservation, Arizona*. Proc. U.S. Nat. Mus., 1927, vol. 72, art. 22, 4 pp., 3 pls.

Two masses (306 and 124 kilos) of somewhat weathered meteoric iron were found five feet apart in 1927 near the Grand Canyon of the Colorado River in Mohave Co. A meteor was observed in the neighbourhood in 1904 or 1905. The structure of the larger mass, now in the United States National Museum, is that of a fine octahedrite with angular enclosures of schreibersite. Analysis made by E. V. Shannon on 70 grams of the iron gave Fe 90.118, Ni 9.118, Co 0.147, Cu 0.002, Pt trace, Mn nil, S 0.006, P 0.402, insol. 0.032, total 99.825. Analysis by F. A. Gonyer of the schreibersite gave Fe 63.62, Ni 22.36, P 14.36 %.

L. J. S.

McCALLIE (S. W.). *Notes on the Social Circle meteorite*. Amer. Journ. Sci., 1927, ser. 5, vol. 13, p. 360.

A mass of iron weighing 219 lb. was ploughed up several years ago near Social Circle, Walton Co., Georgia, U.S.A. An etched section shows an indistinct octahedral structure with granulation. Analysis by E. Everhart gave Fe 94.07, Ni 5.02, Co 0.38, Cu trace, Sn 0.09, P 0.06, = 99.62; sp. gr. 7.42.

L. J. S.

LONSDALE (John T.). *The Florence meteorite of Williamson County, Texas.* Amer. Min. 1927, vol. 12, pp. 398-404, 2 pls. [= pp. 403-404].

A stone weighing 3640 grams was seen to fall near Florence at 8 p.m. on Jan. 21, 1922. It consists of olivine and enstatite (77.37), metallic iron (17.62), and troilite (5.01 %), and is classed as a grey breccia-like chondrite. Several types of chondrites are figured. Analysis by E. V. Shannon of the metallic portion gave Fe 91.277, Ni 8.270, Co 0.426, Cu 0.009, P 0.018 = 100.000. Analyses are also given of the soluble and insoluble silicates.

L. J. S.

HANUŠ (František). *O moldavitech čili vltavínech z Čech a Moravy.* [On moldavites or vltavines¹ from Bohemia and Moravia.] Rozpravy České Akad., Class 2, 1928, vol. 37, no. 24, 83 pp., 8 pls. French résumé in Bull. Intern. Acad. Tchèque Sci., 1928, vol. —, pp. —.

The author's studies of tektites are based on his collection of five to six thousand specimens, some of which were collected in situ by himself. The main part of the present monograph is devoted to descriptions of the forms and surface markings of moldavites, and their genetic interpretation. Moldavites are found widely distributed in two areas: an eastern one in Moravia extending from Oslavany to Třebíč, and a western one between Jindřichův Hradec and Lhenice in southern Bohemia. These have a total length of 150 km. and an extent of 1,400 sq. km. It is suggested that all these moldavites were derived from a single meteoric mass, estimated to weigh 100 tons. The air pressure opposing a velocity of 1.5-2 km. per second would be sufficient to cause the separation of molten drops (melting-point 1300-1500°C.). It is further suggested that the Moravian moldavites were the first separated, when the temperature was higher and the viscosity less; and that the Bohemian moldavites, with their longer forms and sharper sculpturing, belonged to a slightly later period when the temperature was lower and the viscosity higher. Two unpublished analyses made by K. Preis about 35 years ago are given of moldavites from: I, Týn nad Vltavou; and II, Radomilice, both in Bohemia.

	SiO ₂ .	Al ₂ O ₃ .	Fe ₂ O ₃ .	MnO.	MgO.	CaO.	Na ₂ O.	K ₂ O.	Total.
I.	79.40	9.80	3.24	trace	2.23	2.64	0.27	2.94	100.52
II.	79.14	8.25	3.35	trace	2.37	3.64	0.70	3.10	100.55

F. S.

¹ From Vltava, the Czech name of the Moldau river.

DAVID (*Sir T. W. Edgeworth*), SUMMERS (H. S.), & AMPT (G. A.). *The Tasmanian tektite—Darwin glass*. Proc. Roy. Soc. Victoria, 1927, vol. 39, pp. 167–190, 1 pl., 4 text-figs.

Darwin glass [M.A. 1–407] from Mt. Darwin on the west coast of Tasmania is described in some detail. The fact that it is found in glacial morains and never higher up on the mountain suggests that it fell on ice during the Pleistocene glaciation. New analyses are given of: I, smoke-grey glass full of vesicles, sp. gr. (of the fine powder) 2.296, n 1.474; II, pale greenish-grey glass with many vesicles.

	SiO ₂ .	TiO ₂ .	Al ₂ O ₃ .	Fe ₂ O ₃ .	FeO.	MgO.	CaO.	Na ₂ O.	K ₂ O.	H ₂ O.	Total.
I.	86.34	0.52	7.82	0.63	2.08	0.92	0.05	0.15	0.87	0.46	99.95*
II.	87.00	0.51	8.00	0.19	1.93	0.82	nil	0.14	0.99	0.36	99.94

* Incl. ZrO₂ 0.11, P₂O₅ trace, Cl nil?

Published analyses (25) of tektites are plotted on diagrams. The various hypotheses as to the origin of Darwin glass—artificial, volcanic, fulguritic, meteoritic—are each discussed in turn and all eliminated except the last, for which, however, there is no direct evidence. A map shows that the distribution of the schonite of Sweden, moldavites of central Europe, billitonites of the East Indies, australites of Australia, and Darwin glass of Tasmania, is along a great circle of the globe.

L. J. S.

STUTZER (O.). *Kolumbianische Glas-Meteorite (Tektite)*. Centr. Min., Abt. A, 1926, pp. 137–145, 4 figs.

DÖRING (Th.) & STUTZER (O.). *Kolumbianische Glasmeteorite*. Centr. Min., Abt. A, 1928, pp. 35–41.

The glass balls from Colombia were described as obsidian by A. Humboldt in 1826 and were suggested to be tektites by R. Lleras Codazzi in 1916 [M.A. 1–334, 3–129]. They are found in large numbers on or near the surface on the hills and in the valleys over a large area near Cali. At Tetilla near Popayan splinters of the same kind of glass are found in abundance. Analysis of these splinters gave SiO₂ 76.37, TiO₂ 0.11, Al₂O₃ 12.59, Fe₂O₃ 0.26, FeO 0.48, MnO 0.14, MgO 0.17, CaO 0.79, Na₂O 3.36, K₂O 4.67, H₂O 0.97, SO₃ 0.13, Sb₂O₃ 0.07, P₂O₅ 0.02, total 100.13; sp. gr. 2.310. Heated at 1100° C. 10 gr. of material gave off 8.3 c.c. of gas (CO₂ 27.1, CO 24.4, H₂ 35.3, CH₄ 2.2, O₂ 1.1 %). The gas given off by moldavite was also determined and compared with the gas from obsidian. The name colombites (Kolumbiten) is suggested for these tektites, which are believed to be of cosmic origin.

L. J. S.

FRIEDLAENDER (Immanuel). „*Tektite*“ von Columbien. Centr. Min., Abt. A, 1927, pp. 67-69, 1 fig.

Argues that the glass balls of Colombia are not tektites, but volcanic glass (obsidian). L. J. S.

LINCK (G.). *Oberfläche und Herkunft der meteorischen Gläser (Tektite)*. Neues Jahrb. Min. 1928, Beil.-Bd. 57, pp. 223-236, 1 pl., 1 text-fig.

A brief review is given of tektites. They show a range in sp. gr. of 2.337-2.48 and in n_D of 1.486-1.5097. The average composition given under I is near that of a fused clay, and the conclusion is drawn that they are fused sedimentary rocks. The large ($9 \times 6 \times 6$ cm.) tektite from Peru [M.A. 3-97] containing crystallites has the composition II. When heated at 950°C . it loses gas, CO_2 and CO (the latter probably due to reduction of CO_2 in the presence of FeO), amounting to 20.2 c.c. per 100 gr. of glass. This viscous glass must therefore have been fused under pressure, and the surface sculpturing (quite distinct from that of meteorites) was no doubt produced at the same period. It is suggested that tektites are volcanic bombs shot from the moon during the Pleistocene period.

	SiO_2 .	Al_2O_3 .	FeO.	MgO.	CaO.	Na_2O .	K_2O .
I.	79.29	11.07	3.21	0.99	2.21	0.45	2.48
II.	70.56	20.54	0.96	0.11	0.78	3.47	3.38

L. J. S.

Topographical Mineralogy.

MORGAN (R. S.). *Appendix on the English equivalents and quasi-equivalents of certain Welsh place names*. Proc. Geol. Assoc. London, 1927, vol. 38, pp. 332-338.

This is an appendix to papers by A. H. Cox and A. K. Wells (ibid., pp. 265-331) on the geology of and a visit to Dolgelley, Merionethshire. It gives a glossary of common prefixes and suffixes in Welsh place-names and a list of some of the place-names, with their meanings, in the Dolgelley district.

L. J. S.

TETZNER (A.) & EDELMANN (F.). *Neue sächsische Mineralvorkommen. Ergänzung zu Frenzel*: „*Mineralogisches Lexicon für das Königreich Sachsen*.“ Jahrb. Berg- und Hüttenw. Sachsen, 1926, vol. 100, pp. A49-A72; 1927, vol. 101, pp. A70-A122.

These are notes to supplement A. Frenzel's useful book on the minerals of Saxony (1874). Since that date much work has been done by Frenzel himself, A. Weisbach, C. Winkler, F. Kolbeck, and others. In each

part species and varieties are dealt with in alphabetical order; and in addition to extracts from the literature, much new matter, based on the Freiberg and Dresden collections, is added. Notable additions since 1874 to the list of Saxon minerals are argyrodite (in which Winkler discovered germanium in 1886), canfieldite, ultrabasite, &c. Normannite is a name left in manuscript in the Freiberg collection by A. Weisbach for a basic bismuth carbonate, $3\text{Bi}_2\text{O}_3 \cdot \text{CO}_2$, occurring as brown globular aggregates in the Wolfgang Maassen mine at Neustädtel near Schneeberg. A third part is promised in which an index of localities will be given.

L. J. S.

SCHULZ (Karl) [1885–1928]. *Beiträge zur Kenntnis der Mineralien von Rüdersdorf bei Berlin*. Neues Jahrb. Min., Abt. A, 1928, Beil.-Bd. 57, pp. 743–763.

Minerals found in calcite druses in Triassic limestone (Muschelkalk) at Rüdersdorf include blende, millerite, pyrite, marcasite, chalcopyrite, quartz, celestine. Black cleavage plates of blende gave Zn 67.31, Fe 2.18, S 30.42 = 99.91, sp. gr. 4.104. The methods of distinguishing pyrite and marcasite when distinct crystals are not present are reviewed. A yellow iron sulphate resulting from the alteration of marcasite gave, on analysis by M. Bendig, SO_3 40.15, Fe_2O_3 25.64, FeO 1.50, MgO 2.83, CaO 0.28, H_2O 30.88, insol. 0.30 = 101.58. L. J. S.

HIBSCH (J. E.). *Erläuterungen zur geologischen Karte der Umgebung von Böhm. Kamnitz*. Knihovna Státního Geol. Ústavu Československé Republiky, 1927, vol. 10, 99 pp., 1 geol. map, 5 pls., 19 text-figs.

In the course of the explanation of this sheet of the geological map (scale 1 : 25,000) [M.A. 3–27] an account is given of the Tertiary eruptive rocks which include trachytic and tephritic phonolites, a variety of basalts and of tephrites, and augite-monchiquite dikes. In some of the felspar-basalts zeolites (phillipsite, and also analcime) have developed in the epimagmatic period of solidification. Had the same rocks completed their crystallization at a higher temperature the place of the zeolites would have been taken by nepheline. Phillipsite is found filling interstices between the other constituents in a phillipsite-tephrite. Sodalite-tephrite, glass-tephrite, and another zeolite-tephrite are also described. Olivine-free basaltic rocks, containing an augite almost colourless in thin section, is described as 'tephritic basalt', and two analyses are given. The plagioclase in these rocks is andesine with 30–35 % anorthite. Transformation of augite to biotite is recorded in some

felspar-basalts. The mineral occurrences mentioned are of lithomarge, celadonite, and various zeolites including levyne, first recorded from Oberkamnitz by F. X. M. Zippe in 1829 and confirmed in 1924 by F. Slavík.
W. C. S.

TUĆAN (Fran). *Prilog poznavanju minerala Jugoslavije*. [Supplement to the knowledge of the minerals of Yugoslavia.] Геол. Анал. Балк. Полуостр. (Ann. Géol. Pénins. Balkan.), Beograd, 1927, vol. 9, pp. 77-83, 4 figs. [Croatian; cf. M.A. 2-429.]

Descriptions with chemical analyses are given of: Asphalt (sp. gr. 1.890) from Prugova in Dalmatia; quartz-sand from Perna, near Topuska in Croatia; ochre from Rudine, near Glina in Croatia; and tetrahedrite from Mračaj in Bosnia. Quartz crystals (*m r z s*) are mentioned from Čazma in Croatia. Anatase, as small pyramidal crystals (*pez*), was found enclosed in quartz from Kruščica, near Travnik in Bosnia.
F. TUĆAN.

The mineral resources of the Philippine Islands for the years 1924 and 1925. Division of Geology and Mines, Manila, 1927, 148 pp., 3 maps.

To mark the jubilee of the foundation of the Bureau of Mines, the present statistical annual report presents a general review of the mineral resources and mining industry of the Philippine Islands. There are chapters by different authors on the geography, geology, history of mining, and on each of the mineral products. A preliminary geological map (scale, 1 : 2,000,000) and a mineral map are given. Gold has always been the principal product. A small amount of platinum (137 grams in 1925) has been produced as a by-product of gold-dredging at the Lianga mines, Surigao.
L. J. S.

WALKER (T. L.) & PARSONS (A. L.). *Notes on Canadian minerals—tremolite, clinohumite, stromeyerite, natron, and hexahydrate*. Univ. Toronto Studies, Geol. Ser., 1927, no. 24, pp. 15-23, 1 fig.

Tremolite, from Faraday township, Hastings co., Ontario, was found as good crystals (up to $10 \times 6 \times 4$ cm.) loose in the surface soil together with albite and microcline, having been weathered out from the underlying crystalline limestone. They show the forms *abcδmexr* [Dana's letters] and new (410), (230), (250), γ (132). Extinction-angle on (010) $16\frac{1}{2}$ -17°, sp. gr. 2.96. Analysis by H. C. Rickaby gave SiO₂ 57.36, TiO₂ 0.14, Al₂O₃ 1.04, Fe₂O₃ 0.21, FeO 0.72, MgO 25.22, CaO 12.41, Na₂O 1.49, K₂O 0.47, H₂O 0.44; total 99.50. Clinohumite from

Chaffey's Locks, Ontario, as amber-yellow grains in crystalline limestone; sp. gr. 3.17, α 1.628, β 1.642. Analysis by H. C. Rickaby, SiO_2 37.42, TiO_2 1.14, Fe_2O_3 0.46, FeO 1.27, MgO 56.32, MnO 0.10, H_2O 0.56, F 5.04, total (less O for F) 100.19, agreeing with Penfield and Howe's (1894) formula $\text{Mg}[\text{Mg}(\text{F},\text{OH})]_2\text{SiO}_4 \cdot 3\text{Mg}_2\text{SiO}_4$. Strome-yerite from Ontario is massive and brittle with smooth conchoidal fracture and molybdenite-blue colour; it has previously been mistaken for chalcosine or bornite. Analysis of material from Morrison mine, Gowganda, gave Cu 31.46, Ag 51.80, Fe 0.30, S 16.08, insol. 0.32, total 99.96, sp. gr. 6.26; and from Foster mine at Cobalt, Cu 31.00, Ag 53.31, Fe trace, S 16.02, total 100.33. Natron collected during the winter from a soda-lake near Clinton, British Columbia, is colourless and glassy with sp. gr. 1.34 and $n < 1.47$. On exposure to air it becomes white and chalky. Analysis, Na_2O 21.23, CO_2 15.46, H_2O 63.59, with traces of Cl , Mg , and insoluble matter, shows it to be a purer natron [$\text{Na}_2\text{CO}_3 \cdot 10\text{H}_2\text{O}$] than previously found in nature. Hexahydrate ($\text{MgSO}_4 \cdot 6\text{H}_2\text{O}$) occurs as a white chalky dehydration product of clear glassy epsomite, which is found as crystals a foot or more in length in a lake deposit near Oroville, Washington, U.S.A. Five analyses of material from this locality, and from Ashcroft, British Columbia [M.A. 1-325], show a range from $6\text{H}_2\text{O}$ to $7\text{H}_2\text{O}$, the amount varying with the humidity of the atmosphere. Water is reabsorbed in a moist atmosphere.

L. J. S.

POITEVIN (Eugene). *Contributions to Canadian mineralogy*, 1926. Bull. Geol. Survey Canada, 1927, no. 46 (Geol. Ser. 47), pp. 1-21, 2 pls., 7 text-figs.

A new Canadian occurrence of phosphorite from near François Lake, British Columbia [M.A. 3-470]. Optical properties of chemically analysed ferroprehnite from Adams Sound, Baffin Island (pp. 12-13).—The original material [M.A. 1-153] gave α 1.632, β 1.642, γ 1.665, $2V$ $68^\circ 10'$. Zircon from Dungannon township, Hastings county, Ontario (pp. 14-15).—Small crystals from nepheline-syenite show the forms $a m p z \phi u v$ [Dana's letters] and new (441), (665). Epidesmine from Thetford Mines, Megantic county, Quebec (p. 15).—Small yellowish-white crystals from vugs in a granitic rock are orthorhombic and optically negative with α 1.485, γ 1.501; sp. gr. 2.16. Halotrichite from Ashcroft, B.C. (pp. 15-16).—White silky fibres gave α 1.482, γ 1.487, with large extinction-angle. Tremolite crystals from Admaston township, Renfrew county, Ontario (p. 16).—Crystals, with feathery tremolite,

calcite, and blende, show six forms [orientation not stated]. Yellowish barite from Port Arthur, Ontario (p. 16).—Crystals associated with fluorite show eight forms; a 1.637, β 1.638, γ 1.648. Alunogen from Vernon, B.C. (pp. 16–17).—Pinkish needles intermixed with epsomite, &c., gave a 1.463, β 1.475, γ 1.483. Wolframite from Mud creek, Rocher Déboulé mountains, near Hazelton, B.C. (p. 17).—Crystals show the forms $a m b$ and new (130). Zircon from Monmouth township, Haliburton county, Ontario (pp. 17–18).—A crystal (15×7 mm.) shows the forms $a m c p z$. Tourmaline from Bagot township, Renfrew county, Ontario (p. 18).—Black crystals in limestone show the forms P : $p a b c m \omega \eta$ [Goldschmidt's letters] (2241), (4150), and new (21.7.28.4), (9.5.14.1). Scolecite from Thetford Mines, Megantic county, Quebec (pp. 18–20).—Crystals with diopside in fissures in aplite show the forms $b a m d o$ [Dana's letters]. Barite from Madox township, Hastings county, Ontario (pp. 20–21).—Minute, almost fibrous, crystals elongated along the c -axis on fluorite.

L. J. S.

VAUX (George, Jr.) [1863–1927]. *The mines at the Falls of French Creek, Chester County, Pennsylvania*. Amer. Min., 1928, vol. 13, pp. 25–29.

The magnetite mines near St. Peters railway station have yielded good specimens of pyrite and chalcopyrite as distorted and skeletal crystals, magnetite, byssolite, calcite, and apophyllite. The last in considerable amount as white platy crystals, yellowish or flesh-coloured prisms, and opaque olive-green crystals ($c p$).

L. J. S.

O'HARRA (Cleophas C.) & CONNOLLY (Joseph P.). *The geology, mineralogy, and scenic features of Custer State Park, South Dakota*. Bull. South Dakota School of Mines, 1926, no. 14, 123 pp., 60 pls., 5 text-figs.

This state park, covering about 191 square miles, is located in Custer County in the Black Hills, and is noted for its fine scenery, due to the weathering of the granite into peaks and needles. Harney Peak is the culminating summit. A popular outline is given of the geology and mineralogy, and many interesting photographs are added. A list is given of 97 minerals that have been found in the granite and associated pegmatite veins, many of which are of economic value. Lithia minerals found in abundance include: spodumene, as gigantic crystals [M.A. 1–305], amblygonite, lepidolite, lithiophilite (100 tons of which have been mined), &c. Common beryl (none of gem quality) occurs in some

abundance, and mention is made of a large crystal, 46 inches in diameter, which has not yet been uncovered along its full length. L. J. S.

SCHWARTZ (G. M.). *The Black Hills mineral region*. Amer. Min., 1928, vol. 13, pp. 56-63.

A general outline with references to the more important literature on the Black Hills of South Dakota. The pegmatite veins around the Harney Peak granite have yielded many minerals, and in the northern district the Homestake mine in cummingtonite-schist is the largest gold mine in the United States. L. J. S.

CODAZZI (Ricardo Lleras). *Los minerales de Colombia*. Bogotá (Biblioteca del Museo Nacional), 1927, 150 pp., 20 pls.

Half (73 pp.) of this book is occupied by an elementary outline of crystallography and mineralogy for the instruction of those readers engaged in agriculture, mining, &c., who wish to learn something about the minerals of their native country. The remainder gives a brief account of the characters of the several minerals known from Colombia, with statements of their localities and modes of occurrence. The classification is an old one to serve a popular purpose, viz. alkaline, earthy, and stony minerals, gems, mineralizers, metallic minerals, and organic compounds. Some of the matter has appeared in the author's previous publications [M.A. 3-129]. L. J. S.

SIMPSON (Edward S.). *Contributions to the mineralogy of Western Australia. Series II*. Journ. Roy. Soc. Western Australia, 1927, vol. 13, pp. 37-48, 1 pl., 3 text-figs. [Cf. M.A. 3-131.]

(1) Hydrothorite (sp. nov.), Wodgina, North-west Division.—This together with thorogummite and pilbarite occur as alteration products of mackintoshite in a pegmatite vein. It is pale pink or cream, earthy, and very friable; H. 1-2, optically isotropic, n 1.638. Analysis gave SiO_2 15.77, ThO_2 57.79, Ce_2O_3 0.24, Y_2O_3 0.73, UO_3 2.98, Mn_2O_3 trace, Al_2O_3 0.88, PbO 1.25, CaO 1.65, MgO 0.60, H_2O 15.18, CO_2 1.50, P_2O_5 1.33, total 99.90. Deducting about 10 % of impurities, the formula is $\text{ThSiO}_4 \cdot 4\text{H}_2\text{O}$. 9.12 % H_2O is lost at 100° and about 5 % at 600°C . (2) Lithiophilite and purpurite, Wodgina.—Lithiophilite is found in some abundance in the pegmatite veins worked for tantalite. It shows a progressive alteration from honey-yellow material to brown purpurite $[(\text{Mn}, \text{Fe})_2\text{O}_3 \cdot \text{P}_2\text{O}_5 \cdot \text{H}_2\text{O}]$ and finally to black psilomelane and limonite. Analysis of the least altered fragment gave P_2O_5 42.77, FeO 4.23, Fe_2O_3 2.50, MnO 22.77, Mn_2O_3 13.38, Co_2O_3 0.10, CaO 3.30, MgO 0.84, Li_2O

4.48, Na_2O 0.15, K_2O 0.05, F nil, H_2O 5.68, insol. 0.42, total 100.67; sp. gr. 3.23. (3) Autunite, Wodgina.—Fine scaly material was found at the junction of thorogummite and lithiophilite. (4) Spessartite, Wodgina.—Pale pink to brownish-red crystals (d_n) up to 3 cm. across are found in the tantalite-bearing pegmatites and debris. Analysis gave SiO_2 36.03, TiO_2 0.03, Al_2O_3 20.84, Fe_2O_3 trace, FeO 4.18, MnO 37.79, CaO 0.81, MgO 0.19, total 99.87; sp. gr. 4.16. (5) Pilolite, Wadara Hills, N.W. Div.—Analysis of cork-like material gave SiO_2 55.12, Al_2O_3 9.67, Fe_2O_3 1.25, MnO trace, MgO 10.55, H_2O (+100°) 13.14, H_2O (−100°) 10.48 = 100.21. This and other analyses of pilolite and palygorskite are explained as mixtures of $\text{H}_4\text{Al}_2\text{Si}_2\text{O}_9 \cdot \text{H}_2\text{O}$ (halloysite) and $\text{H}_4\text{MgSi}_3\text{O}_9 \cdot 2\text{H}_2\text{O}$ ('picrocollite') molecules. (6) Lepidolite (uniaxial and biaxial) and muscovite, Londonderry, Central Division.—Large 'books' of lepidolite were formerly quarried in a pegmatite vein. The clear transparent sheets (up to 40×30 cm.) are pale purplish brown. This lepidolite is abnormal in being optically uniaxial (ω 1.5550, ϵ 1.5324, A. N. Winchell, 1925; M.A. 3–12) and in its high lithia content (analyses I and II; also Li_2O 6.15, Na_2O 0.52, K_2O 11.12%). Rough crystals show the forms c (001), p (113), e (023), and on the basal plane unusual etch-figures are developed. Along the foot-wall of the same vein is a lepidolite of identical appearance but with optic axial angles ranging from $5^\circ 6'$ to $52^\circ 53'$; two specimens gave:

2E.	2V.	β .	γ .	$\text{Bx}_a(a):c$.
$52^\circ 53'$	$33^\circ 18'$	1.553	1.557	$1^\circ 20'$ (analysis III).
$8^\circ 35'$	$5^\circ 32'$	1.553	1.555	3° —

The chemical composition of both the uniaxial and the biaxial material corresponds to $\text{F}_4\text{Li}_4\text{K}_2\text{Al}_4\text{Si}_8\text{O}_{23} = 2\text{Li}_2\text{O} \cdot \text{K}_2\text{O} \cdot 4\text{AlO} \cdot 8\text{SiO}_2$. The uniaxiality may perhaps be due to repeated twinning. In the same vein there are smaller sheets of pale mauve or sea-green muscovite, with 2E_{Na} $77^\circ 48'$ (for a mauve crystal) and $76^\circ 52'$ (for a green crystal); analysis of the mauve-coloured material gave IV.

	SiO_2 .	TiO_2 .	Al_2O_3 .	Fe_2O_3 .	MnO .	Li_2O .	K_2O .	Na_2O .	H_2O .	F.	Total.	Sp. gr.
I.	51.67	0.6	23.22	0.04	1.37	5.83	11.18	1.03	0.44	8.22	99.90	2.85
II.	51.00	trace	24.13	trace	1.20	5.97	10.31	2.43	0.22	7.79	99.77	2.75
III.	52.57	0.4	23.01	0.08	0.63	6.37	11.10	0.90	0.59	8.26	100.07	2.83
IV.	45.22	n.d.	37.46	trace	0.71	0.32	10.71	1.19	3.68	0.73	100.75	2.77

I, also MgO 0.30; II, MgO , CaO , traces; IV, FeO 0.56, MgO 0.38, CaO 0.10.

(7) Tetrahedrite, Kalgoorlie, Central Division.—Previous analyses of the fahlerz from the gold mines have shown an excess of arsenic over

antimony, indicating tennantite. A specimen showing rough crystals (111) (211) (411) from the Ivanhoe gold mine contained As 5.58, Sb 21.36 %, indicating tetrahedrite. (8a) Meteoric iron, Murchison Downs, Murchison Division.—A complete pear-shaped mass weighing only 33.5 grams was found in 1925 at lat. $26^{\circ} 40' S.$, long $119^{\circ} 0' E.$ The structure is that of a fine octahedrite. (8b) Meteoric iron, East Mt. Magnet, Murchison Division.—A sickle-shaped mass weighing $16\frac{1}{2}$ kilos was found in 1916 at $28^{\circ} 10' S.$, $118^{\circ} 30' E.$ Analysis gave Fe 85.66, Ni 13.56, Co 0.77, P 0.05, C strong traces, S trace, total 100.04; sp. gr. 7.967. Polished and etched sections show an unusual brecciated structure with the areas outlined by schreibersite, and in the areas a faint sheen indicating the finest octahedrite structure. L. J. S.

Miscellaneous.

JIRKOVSKÝ (Rudolf). *Chemický rozbor epsomitu ze zahořanských břidlic na Letná.* [Chemical analysis of the epsomite from the schists of the Zahořany horizon on the Letná.] *Časopis Národního Musea, Praha*, 1928, vol. 102, pp. 59–60.

The Ordovician schists on the Letná at Prague are sometimes coated with a white efflorescence, which in the eighteenth century was used for medicinal purposes under the name 'Bruska salt'. Analysis gave SO_3 28.10, MgO 13.63, CaO 0.52, insol. 15.58, H_2O (diff.) 42.17, with traces of iron, aluminium, and alkalis. F. S.

JIRKOVSKÝ (Rudolf). *Dva české nerosty ze skupiny jarositové.* [Two Bohemian minerals of the jarosite group.] *Časopis Národního Musea, Praha*, 1927, vol. 101, pp. 151–155.

(1) 'Misy' from Kopeč near Vodolka, north of Prague, forms yellow crusts in fissures in augitite and its tuffs. Sp. gr. 2.91, ϵ 1.708, $\omega > 1.745$. Analysis of material, proved microscopically to contain only very small amounts of gypsum, a ferric sulphate (probably basic), and decomposed rock, gave SO_3 29.47, Fe_2O_3 28.73, Al_2O_3 18.90, CaO 0.84, MgO 1.55, K_2O 6.00, Na_2O 1.68, H_2O 10.57, insol. 2.26, total 100.00. This shows the highest degree of miscibility of the jarosite and alunite molecules (nearly 1 : 1) yet observed in this group. (2) A yellow earthy mineral, accompanying vivianite, gypsum, and delvauxite on coprolites in Permian shale from Valdice near Košťálov, has been mentioned as oxalite. It is now proved by chemical and microscopical tests to be natrojarosite. F. S.

ULRICH (František) & VESELÝ (Václav). *Poznámka o sfaleritu z Mantovy u Chotěšova*. [Note on the sphalerite from Mantova near Chotěšov.] *Věstník Státního Geol. Ústavu Československé Republiky*, 1927, vol. 3, pp. 32-35.

In the Masaryk coal mine at Mantova in western Bohemia, a galena-blende vein, traversing granite beneath the Carboniferous formation, has been worked for a short period. The blende from this locality has been reported to contain fluorine, but the following analysis proves this to be absent: Zn 56.99, Fe 5.80, Pb 0.04, Ag 0.01, S 30.89, CaO 2.68, MgO trace, CO₂ 2.38, H₂O 0.03, insol. 1.12, total 99.94, corresponding with a normal composition 9ZnS.FeS. Sp. gr. 4.03. The succession of the vein-filling minerals is quartz, blende, galena, with small amounts of chalcopyrite and calcite. F. S.

JAROŠ (Zdeněk). *Nové naleziště lepidolithu a nerostů s ním sdružených na západní Moravě*. [New locality for lepidolite and associated minerals in western Moravia.] *Příroda* [= Nature], Brno, 1928, vol. 21, pp. 43-44.

— *Nerosty pegmatitových balvanů a pyroxenického syenitu od Puklic u Jihlavy*. [The minerals of pegmatite boulders and pyroxene-syenite from Puklice near Jihlava.] *Sborník Přírodovědeckého Klubu*, Brno, 1928, vol. 10 (for 1927), pp. 31-36.

Lepidolite, as coarse lilac-coloured scales, has been found in a pegmatite vein at Puklice near Jihlava (= Iglau). Associated minerals are orthoclase, albite, tourmaline (black, red, and green), smoky-quartz, muscovite, rarely biotite, apatite (colourless to bluish-green), spessartine, honey-yellow topaz, beryl (colourless, pale yellow, and pale green), and small grains and crystals of cassiterite and wolframite. The pyroxene-syenite contains pyrrhotine and chalcopyrite, and along small fissures secondary analcime. F. S.

ŠPAČEK (Josef). *Hatchettin a valait v českém siluru*. [Hatchettine and valaite in the Silurian of Bohemia.] *Sborník přírodovědecký*, Praha, 1927, vol. 4, pp. 43-56, 9 figs. [Czech with English summary.]

A review is given of the publications dealing with the occurrence of bituminous substances in the Silurian (and Devonian) rocks of central Bohemia. The concretions of bituminous dolomitic limestone, called 'naphthodes', have surface irregularities, supposed to be due to internal tension caused by gases, rather than after the form of crinoids. The

hatchettine and valaite have been derived from naphtha, which is still present in small amounts and is evidently of animal origin. Diabases near these beds often contain a kind of coal, supposed to be 'petroleum coke' and formed by the igneous intrusion into the carbonaceous beds.

F. S.

ŠTĚPÁNEK (J.). *Biotit-skapolitová břidlice od Petrova u Kunštátu.* [Biotite-scapolite-schist from Petrov near Kunštát.] Časopis Moravského Zemského Musea, Brno, 1927, vol. 25, pp. 202-213, 1 pl. [Česky with 2 pp. German résumé.]

A biotite-schist at this locality contains porphyroblasts (averaging 10×7 mm.) of scapolite showing columnar, often rounded, forms, and rendered soft and dull by superficial alteration. Chemical tests showed the presence of chloride and carbonate, but no sulphate. Sp. gr. about 2.6, ω 1.579, ϵ 1.553. These data suggest the approximate composition 70 % carbonate-meionite with 30 % chloride- and oxide-marialite.

F. S.

VYSLOUŽIL (Josef). *Löllingit z pegmatitu od Dolních Borů.* [Löllingite from the pegmatite of Dolní Bory.] Příroda, Brno, 1928, vol. 21, p. 84.

A mass of löllingite found in pegmatite at Dolní Bory in western Moravia gave on analysis Fe 27.83, As 71.36, S 1.46, insol. 0.17 = 100.82.

F. S.

SLAVÍK (Fr.). *Note sur l'anthophyllite-asbeste manganésifère des mines de Jacobeni-Arșița.* Ann. Sci. Univ. Jassy, 1928, vol. 15, pp. 133-135.

Fissures in brown-black oxide ore from the manganese mines at Arșița near Jacobeni, Bukovina, contain a finely fibrous mineral with the fibres ($1\frac{1}{2}$ cm.) perpendicular to the walls of the fissure. The fibres are extremely fine and give straight extinction; γ ($\parallel c$) 1.655, mean n ($\perp c$) 1.635. The mineral fuses readily before the blowpipe to a black mass, and it gives a strong reaction for manganese.

L. J. S.

KRENNER (Josef) [1839-1920]. *Mineralogische Mitteilungen aus Ungarn.* Centr. Min., Abt. A, 1928, pp. 138-142, 5 figs.

Felsőbányite occurs at Felsőbánya as globular aggregates on quartz with marcasite, as yellow tabular crystals on barytes, or as white beads on needles of stibnite. The globules consist of a radial aggregate of thin plates, with a terminal angle of $66^\circ 24'$. There are two good cleavages and the optical characters point to orthorhombic symmetry; optically

positive, $2H\ 56^\circ 14'$. Inesite was found in 1904 at Nagybánya as pale-rose globules with radially fibrous structure in quartz. On the (010) cleavage the extinction-angle is $29^\circ 10'$ to a second cleavage. Scheelite was found in 1877 at Csiklova [M.A. 3-99] as crystals (*e*, *ep*) in calcite or on tetradymite in association with epidote, blende, and garnet.

L. J. S.

ZSIVNY (Victor). *Mineralogische Mitteilung aus Ungarn. II.* Zeits. Krist., 1928, vol. 66, pp. 651-653. [Cf. M.A. 3-507.]

3. *Einige Mineralien von Gyertyánliget (Komitat Máramaros).*—On an old specimen from this locality (formerly Kabolapolyánka, Kobolya-polyána, &c.) [now Koboleckaja Poljana in Carpathian Ruthenia, Czechoslovakia], galena, blende, baryte, and fluorite are present and were deposited in the order mentioned. The fluorite crystals are described.

4. *Melanterite from Alsósajó (Komitat Gömör).*—A grass-green crust from this locality [now Nižná Slaná in Slovakia] gave on analysis $SO_3\ 31.15$, $FeO\ 20.35$, $Fe_2O_3\ 0.83$, $Al_2O_3\ 0.63$, $MnO\ 0.05$, NiO trace, $CuO\ 0.04$, $CaO\ 0.13$, $MgO\ 2.16$, $Na_2O\ 0.08$, $K_2O\ 0.07$, insol. 0.22 , $H_2O\ 43.90$, total 99.61 .

L. J. S.

ŁASZKIEWICZ (Antoni). *Studja mineralogiczne.—Études minéralogiques.* Arch. Min. Tow. Nauk. Warszaw. (Arch. Min. Soc. Sci. Varsovie), 1928, vol. 3 (for 1927), pp. 1-39 (Polish), 40-54 (French résumé), 2 pls., 8 text-figs.

A consideration of the fine structure of quartz and the Reusch method of piling plates of mica to give the effect of rotary polarization suggests that quartz is monoclinic-hemihedral in symmetry. Crystallographic descriptions with measurements are given of quartz, haematite, calcite, baryte, and cerussite from various localities in Poland.

L. J. S.

ŁASZKIEWICZ (Antoni). *Badania krystalograficzne syngenitu z Kałusza.* —*Études cristallographiques sur la syngenite de Kałusz.* Arch. Min. Tow. Nauk. Warszaw. (Arch. Min. Soc. Sci. Varsovie), 1928, vol. 3 (for 1927), pp. 61-68 (Polish), p. 69 (French résumé), 3 figs.

Crystals of syngenite from Kałusz, Poland, showed the forms $abc k \theta \lambda m q r u w \pi$ [Dana's letters], $t(\bar{1}12)$, and new $\gamma(710)$, $y(10.3.0)$, $j(304)$, $w(124)$; also many vicinal faces in the prism-zone $[001]$. The two-circle measurements gave $a : b : c = 1.3691 : 1 : 0.8747$, $\beta = 75^\circ 55'$. The crystals are prismatic or tabular (on *a*) in habit and usually twinned on *a*.

L. J. S.

ŁASZKIEWICZ (Antoni). *Morfologja azurytów łysogórskich.*—*Sur la morphologie des azurites des Monts Chauves.* Arch. Min. Tow. Nauk. Warszaw. (Arch. Min. Soc. Sci. Varsovie), 1928, vol. 3 (for 1927), pp. 128–153 (Polish), 154–158 (French résumé), 8 pls.

Chessylite is well known from the old copper mines in the 'Bald Mts.' near Kielce in Poland. On 47 measured crystals from Miedzianka, Miedziana Góra, and Sosnówka 52 forms are noted, of which ϵ (5.0.18), V (13.0.16), Ψ (506), X (332), Y (232), and Z (372) are new; $a:b:c = 0.8570:1:0.8845$, $\beta = 87^\circ 35'$. Combinations and frequencies of forms and their angles from (010) are tabulated. The crystals are elongated along the b -axis and are tabular parallel to either c (001) or θ (101); six types of crystals are distinguished. Measurements are also given of malachite crystals from Miedzianka, with the forms $abmc$ [Goldschmidt's axes] and twinned on a . L. J. S.

PELLOUX (A.). *Cenni descrittivi sulla morfolite di Castiglioncello.* Atti (Rend.) R. Accad. Lincei, Roma, Cl. Sci. fis. mat. nat., 1919, ser. 5, vol. 28, sem. 2, pp. 503–505.

The magnesite worked in the Livorno hills, Tuscany, occurs as veins in serpentine and euphotide. It is white or yellowish and usually massive, but sometimes shows small lenticular crystals. In one vein it shows an aggregate of spherical (1 cm.) concretions with smaller ($\frac{1}{2}$ cm.) pseudo-crystals having roughly the form of pentagonal-dodecahedra. These 'morpholites' are compared with the dimpled balls of aragonite from Japan. L. J. S.

ZAMBONINI (F.) & CONIGLIO (L.). *Sulla presenza di composti solubili del selenio e del tellurio tra i prodotti dell'attuale attività del Vesuvio.* Ann. R. Osservatorio Vesuviano, 1925, ser. 3, vol. 2, pp. 3–6.

A short review is given of the literature on the occurrence of selenium and tellurium in volcanic products. A yellow incrustation collected in 1925 from the crater of Vesuvius consists of opal, sulphur, chlorides (and sulphates) of alkali metals, with Fe, Pb, Cu, Ca. The aqueous solution contains Se 1.25 % (of the encrustation) and Te 0.04 %. The selenium is perhaps present as selenious acid or as an alkali selenite. L. J. S.

ZAMBONINI (F.). *Sulla presenza della mirabilite fra i prodotti dell'attuale attività del Vesuvio.* Ann. R. Osservatorio Vesuviano, 1925, ser. 3, vol. 2, pp. 117–119.

A. Scacchi in 1885 obtained mirabilite ($\text{Na}_2\text{SO}_4 \cdot 10\text{H}_2\text{O}$) by crystallizing the solution of the mixed salts from Vesuvian fumaroles. This

hydrate is stable only below 32.38° and it has not actually been observed as a Vesuvian mineral. Small, white or slightly yellowish stalactites of a saline incrustation, recently collected in the crater of Vesuvius, consist mainly of mirabilite with some apthitalite. On the surface are crystals with the forms abm [Dana's letters] and the optical characters of mirabilite. Sp. gr. 1.470 (as compared with 1.468–1.469 determined on artificial crystals of $\text{Na}_2\text{SO}_4 \cdot 10\text{H}_2\text{O}$). The existence of exanthalite (exanthalose of F.S. Beudant, 1832) is doubtful, and the dihydrate $\text{Na}_2\text{SO}_4 \cdot 2\text{H}_2\text{O}$ could not be obtained artificially. Lecontite is probably a mixture of the double salts $\text{NaKSO}_4 \cdot 2\text{H}_2\text{O}$ and $\text{NaNH}_4\text{SO}_4 \cdot 2\text{H}_2\text{O}$ rather than $(\text{Na}, \text{K}, \text{NH}_4)_2\text{SO}_4 \cdot 2\text{H}_2\text{O}$. The mirabilite has no doubt been produced by the secondary hydration of thenardite [M.A. 2-562], and 'exanthalite' is probably a mixture of the two. L. J. S.

CONIGLIO (L.). *Sulla presenza di quantità sensibili di iodio in certi prodotti dell'attuale attività del Vesuvio*. Ann. R. Osservatorio Vesuviano, 1925, ser. 3, vol. 2, pp. 123–124.

The stalactites of mirabilite (preceding abstract) consist of sulphates of sodium and potassium with small amounts of iodine (0.13 %) and chlorine (0.55 %). The iodine is undoubtedly present as sodium or potassium iodide, perhaps in solid solution in the chlorides, but these could not be separated by heavy liquids from the sulphates. L. J. S.

ZAMBONINI (F.). *Sulla presenza della picromerite tra i prodotti delle fumarole vesuviane*. Ann. R. Osservatorio Vesuviano, 1925, ser. 3, vol. 2, pp. 121–122.

Picromerite was obtained by A. Scacchi in 1855 only by crystallizing the aqueous solution of mixed salts from Vesuvian fumaroles, and it has not actually been observed there as a mineral. Specimens collected in 1911 and 1916 from the crater of Vesuvius show a white to colourless crystalline crust on lava agreeing in its characters with picromerite. It is clearly a secondary product of the fumarole deposits. L. J. S.

CAROBBI (G.). *Su una varietà di gesso dell'Isola di Vulcano (Eolie) contenente bario e stronzio*. Ann. R. Osservatorio Vesuviano, 1925, ser. 3, vol. 2, pp. 125–126.

Amongst the abundant crusts in the 'Grotta Piccola dell'Allume' on Vulcano, Lipari Islands, are colourless crystals ($bmln$) of gypsum which gave on analysis SO_3 46.70, BaO 0.07, SrO trace, H_2O 20.68 = 100.39. This suggests that $\text{BaSO}_4 \cdot 2\text{H}_2\text{O}$ and $\text{SrSO}_4 \cdot 2\text{H}_2\text{O}$ may exist in limited amount in mixed crystals with $\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$. L. J. S.

SCHOEP (Alfred). *Kassiteriet en topaas uit de tinertsmijnen van Noord Nigeria*. Natuurwetenschappelijk Tijdschrift, Antwerpen, 1928, vol. 10, pp. 3-6, 4 figs. [Flemish with French résumé.]

Crystals of cassiterite and topaz are described from the alluvial tin mines of Northern Nigeria. Cassiterite from the Bauchi plateau as black bipyramidal crystals *s*, or brown prismatic crystals *m h e s t* and *m s z*. The topaz crystals are usually colourless, or sometimes slightly bluish or greenish, and show the forms *c m l f y w d o u* [Dana's letters]. The following optical data correspond with a content of about 20 % fluorine.

		2V.	α .	β .
Balfour Hill, Bauchi prov.	...	64° 40'	1.616	1.623
" "	...	65 54	1.621	1.628
Ninghi Hills, Zaria prov.	...	64 28	1.616	1.625
" "	...	65 0	1.615	1.622

L. J. S.

SCHOEP (Alfred). *Variscite incolore de Mura-Panda*. Bull. Soc. Belge Géol. Bruxelles, 1927, vol. 37, pp. 89-90.

White porcellaneous material from Katanga shows minute colourless to pale-pink and clear crystals lining cavities. Sp. gr. 2.92, H. 4, α 1.578, β 1.590 about, γ 1.699, positive, 2V 32°. Analysis gave P_2O_5 44.33, Al_2O_3 22.97, Fe_2O_3 3.98, insol. 0.90, H_2O 21.21, total '100.30', agreeing with the formula $Al_2O_3 \cdot P_2O_5 \cdot 4H_2O$.

L. J. S.

SCHOEP (Alfred). *Kristallen van cornetiet en hunne brekingsindices*. Natuurwetenschappelijk Tijdschrift, Antwerpen, 1927, vol. 9, pp. 125-128. [Flemish with French résumé.]

Minute crystals of cornetite present in large numbers on a piece of brown sandstone, probably from the Étoile du Congo mine, Katanga, are of a more elongated habit than those previously described [Min. Mag., vol. 19, pp. 225, 301]. They show the forms *m* (110), *v* (221), and new α (100); α 1.765, β between 1.79 and 1.80, γ between 1.83 and 1.84.

L. J. S.

SCHOEP (Alfred). *Sur la giobertite (magnésite) cristalline à tourmaline incolore, linnéite, chalcopyrite, etc., de Luishia (Katanga)*. Bull. Soc. Belge Géol. Bruxelles, 1927, vol. 37, pp. 51-56.

The matrix of the crystals of linnæite [M.A. 3-372] is a white crystalline magnesite (not dolomite) with cleavage-angle 72° 23' and ω 1.700; analysis gave MgO 43.87, CaO 1.16, CuO trace, CoO n.d., insol. 0.018, total 97.078. Embedded in the magnesite are also minute

prisms of colourless tourmaline (sp. gr. near 2.8, ϵ 1.610, ω 1.632 (Na), indicating a magnesian tourmaline), doubly-terminated crystals of quartz, and very little chalcopyrite.

L. J. S.

HACQUAERT (Armand L.). *Coloration de la giobertite de Luishia par de la sphérocobaltite*. Bull. Soc. Belge Géol., Bruxelles, 1927, vol. 37, pp. 75-76.

Pink veinlets in the white magnesite carrying linnaeite [preceding abstract] contain minutely disseminated sphaerocobaltite (ω 1.86) [M.A. 1-416] impregnating the colourless magnesite. The coloration is here due to the intermixture of minerals, rather than to isomorphous replacement as in the pink calcite from Katanga [M.A. 3-266].

L. J. S.

HEIDE (F.). *Die Japaner Zwillinge des Quarzes und ihr Auftreten im Quarzporphyr vom Saubach i. V.* Zeits. Krist., 1927, vol. 66, pp. 239-281, 35 figs.

Four varieties of the Japanese twins of quartz (in which the principal axes are at $84^{\circ} 34'$) are distinguished: I, twin-axis the normal to (1122); II, twin-axis the edge (1213); III, twin-plane the face (1122); IV, twin-plane normal to (1213). These are discussed in relation to the structure theory. Small Japanese twins are attached to the walls of cavities in the quartz-porphyr of Saubach in Vogtland [M.A. 3-378], and they are perhaps also represented in the porphyritic quartz and in the quartz pseudomorphous after orthoclase.

L. J. S.

HLAWATSCH (C.), Analysen von DOHT (R.). *Über Alunogen von Opálbánya (Czerwenitz)*. Festschrift Victor Goldschmidt, Heidelberg, 1928, pp. 154-162, 3 figs.

Efflorescences in the levels of the opal mines [now Červenica in Slovakia] show rosettes of thin platy colourless crystals of alunogen. These are triclinic with the forms b (010), a (100), m (110), d (111), e (111), w (121), r (141), (also q (021) on artificial crystals), and gave the elements $a:b:c = 0.34974:1:0.28786$, $\alpha = 96^{\circ} 53' 38''$, $\beta = 97^{\circ} 41' 49''$, $\gamma = 90^{\circ} 57' 50''$. Cleavage a and e ; twins on (010). Optically positive $c:\gamma = 42^{\circ}$, $\gamma - \beta$ (on (010)) 0.01. Sp. gr. 1.7715 (1.7795 for artificial crystals). Analysis of pure material (and of crusts) gave SO_3 38.51 (37.67), Al_2O_3 15.25 (15.29), MgO 0.31 (0.51), CaO 0.84 (0.16), insol. 0.10 (0.36), H_2O [44.99] (45.83), total 100.00 (99.82), agreeing

with the formula $\text{Al}_2(\text{SO}_4)_3 \cdot 16\text{H}_2\text{O}$. It is suggested that aluminian is not an anhydrous aluminium sulphate.

L. J. S.

SCHREITER (R.). *Über Bleichungszonen im Schieferletten aus dem Heinrichschacht der Gewerkschaft Gottes Segen in Lugau.* (Vorläufige Mitteilung.) Centr. Min., Abt. A, 1925, 143-145.

— *Über vanadiumhaltige Bleichungsringe und Bleichungszonen in den Schieferletten des Rotliegenden aus dem Heinrichschacht bei Ölsnitz i. Erzg.* (Chemische Analysen von H. MAYER.) Ibid., 1925, pp. 214-222, 242-250, 1 pl.

— *Vanadiumoxyde im sächsischen Rotliegenden und ihre Bleichungswirkung.* Jahrb. Berg- und Hüttenw. Sachsen, 1927, vol. 101, pp. A 49-A 69, 2 figs.

The red Permian shales at Ölsnitz and other places in Saxony show patches and rings of a pale-green colour in which is usually a dark greenish-black nucleus of circular or oval cross-section, averaging 1 mm. across but up to 4 cm. The dark material has hitherto been regarded as carbonaceous, but analysis shows V_2O_4 14.93, V_2O_5 1.42, FeO 1.60, H_2O 8-9 %, together with silica, alumina, &c. (mostly as mica), and the absence of carbon. The pale-green patches, which are often concentrically zoned, contain V_2O_5 0.1-2.4 and H_2O 6-7 %, whilst the surrounding red shale contains V_2O_5 traces to 0.1 % and H_2O 3-4 %. The bleaching in the patches has been caused by the reduction of iron in the presence of vanadium oxides. A review is given of vanadium occurrences in general.

L. J. S.

WETZER (W.). *Petrographische Untersuchungen an chilenischen Salpetergesteinen.* Zeits. prakt. Geol., 1924, vol. 32, pp. 113-120, 132-142, 4 figs.

— *Die Salzbildungen der chilenischen Wüste.* Chemie der Erde, 1928, vol. 3, pp. 375-436.

Microscopic examination of thin sections of Chile saltpetre ('caliche') showed the presence of halite, nitratine, darapskite, gypsum, anhydrite, thenardite, glauberite, bloedite, 'Chile-loeweite' (minute trigonal crystals with ϵ 1.434, ω 1.470, sp. gr. 2.153, and, after deducting impurities, the composition $\text{K}_2\text{Na}_4\text{Mg}_2[\text{SO}_4]_5 \cdot 5\text{H}_2\text{O}$), 'chromloeweite' (?), and leonite (?). Potassium perchlorate, although a product of extraction, could not be detected as crystals in the raw 'caliche'. The distribution and relative ages of formation of each of these salts are discussed in detail. It is

considered that the nitrates were formed by the action of atmospheric nitric acid on the alkali silicates of the rocks of the region. L. J. S.

ERNST (E.). *Die Kristallformen des Wolfsbergits. (Chalkostibit, Guejarit, CuSbS_2).* Neues Jahrb. Min., Abt. A, 1927, Beil.-Bd. 56, pp. 275-315, 2 figs.

Eight crystals of chalcostibite from Harz, Bolivia, and Spain, previously measured by H. Laspeyres in 1891 and S. L. Penfield in 1897, were re-measured on the two-circle goniometer, and 42 new forms noted, many of them with high indices. A table of 77 forms is given for this mineral, with detailed discussion, but without any further explanation of the high indices. L. J. S.

WEBER (Leonhard). *Magnesit- und Hamlinithkristalle aus dem Simplontunnel.* Neues Jahrb. Min., Abt. A, 1928, Beil.-Bd. 57, pp. 563-568.

Small water-clear crystals bounded by a hexagonal prism and the basal pinakoid, and suggestive of apatite, were found on gypsum containing streaks of violet anhydrite from the Simplon tunnel, Switzerland. Larger (1 cm.) crystals show a faint tinge of violet. The following data prove the crystals to be magnesite: angle to cleavage (0001):($10\bar{1}1$) = $43^\circ 4\frac{1}{2}'$; refractive indices measured through the natural prism, ω 1.7009, ϵ 1.5131 (Na). Associated with the magnesite are clear crystals of gypsum, and a few minute (1 mm.) dark yellow crystals (cr) of hamlinite. The last shows uneven faces and optical anomalies with $2E$ up to 30° . L. J. S.

TOMKEIEFF (S. J.). *A new occurrence of kaolinite in Northumberland.* The Vasculum, Newcastle-upon-Tyne, 1925, vol. 11, pp. 72-74.

TOMKEIEFF (S.). *On the occurrence and mode of origin of certain kaolinite-bearing nodules in the Coal Measures.* Proc. Geol. Assoc. London, 1927, vol. 38, pp. 518-547, 1 pl., 1 text-fig.

Ironstone nodules found in a fine-grained Coal Measure shale at Cow Gate, Newcastle-on-Tyne, have the cracks in the central part of the nodule filled with kaolinite and calcite. The kaolinite occurs either as a fibrous layer with fibres perpendicular to the walls of the crack or as minute semi-globular bodies with a radial fibrous structure; sp. gr. 2.607, γ 1.565. Chemical analysis, after deduction of iron oxide and CO_2 as impurities and recalculation to 100, gave SiO_2 46.89, Al_2O_3 39.30, H_2O 13.81. A detailed chemical and mineralogical study has been made of the nodules and of the associated shale, and the author discusses the

origin of kaolinite and the formation of concretions with abundant references to previous literature on these subjects. W. C. S.

LIGHTFOOT (B.). *Note on an association of gold and tetradymite in S. Rhodesia.* Trans. Geol. Soc. South Africa, 1928, vol. 30 (for 1927), pp. 1-3.

Tetradymite has been found in association with gold at the New Mystery mine, West Gwanda district. The workings are in a narrow zone of banded green tremolite-schist, which lies between outcrops of serpentine and banded ironstone. Surface samples have been found to carry as much as 101 ounces of gold per ton, but the values fall off rapidly beneath the surface. In the rich ore there are grains of a steel-grey mineral with metallic lustre, which was analysed and found to have the composition (Bi 59.56, Te 35.46, Se trace, S 4.98%) $2\text{Bi}_2\text{Te}_3\cdot\text{Bi}_2\text{S}_3$. The gold and the tetradymite occur as individual grains and also as thin films coating tremolite. S. J. S.

WHITLOCK (Herbert P.). *A study of the crystallography of the calcites of the New Jersey diabase region.* Bull. Amer. Mus. Nat. Hist., 1927, vol. 56, pp. 351-377, 25 figs.

In amplification of previous descriptions by G. vom Rath (1877), A. F. Rogers (1902), and the author himself (1907-8), six characteristic generalized habits are distinguished as representing roughly successive generations of calcite crystallization. The crystals described are associated with prehnite, datolite, quartz, and zeolites in cavities in the basaltic rocks of northern New Jersey, and are mostly on specimens collected at Garrett Rock, West Paterson. The negative rhombohedra (0443) and (0221) are prevalent forms and are shown to be characteristic of diabase regions throughout the world. The six types are respectively dominated by: I, steep positive scalenohedra of the principal zone, e.g. (3251); II, negative rhombohedra, especially (0221); III, obtuse negative rhombohedra, e.g. (0887); IV, negative scalenohedra; V, rich zone of negative rhombohedra; VI, the positive scalenohedron (2131). These types are illustrated by twenty-one crystal drawings, and seventy-five crystal-forms are listed for this region, of which the following are new for calcite: (4.10.14.3), (15.8.23.13), (6.4.10.5), (5494), (5.29.34.18), (3.11.14.7), (4.60.64.49), (1896), (5.10.15.8), (5.10.15.7), and (15.8.23.10). Comparisons are made with material from widespread localities. Unfortunately, many misprints occur in the indices quoted in the text.

E. D. M.